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Observations

ON

THE BOVINE TUBERCLE BACILLUS IN HUMAN TUBERCULOSIS *

BY

A. STANLEY GRIFFITH, M.D., PH.D.
MEMBER OF THE SCIENTIFIC STAFF, MEDICAL RESEARCH COUNCIL
(From the Field Laboratories, University of Cambridge)

It is now thirty-one years since Robert Koch, at the London Congress on Tuberculosis, announced his conclusion that infection of human beings with bovine bacilli was so rare that it was unnecessary to take special measures to prevent it. That statement, which was strongly contested, set in train investigations in many countries into the susceptibility of human beings to bovine tuberculosis, investigations which are still being carried on, and, in consequence of recent findings, with renewed energy and interest. It is appropriate in this, the fiftieth anniversary of Koch's discovery of the tubercle bacillus, to review the bacteriological work of the past thirty years to see where we stand in regard to this pressing and difficult matter of bovine tuberculosis.

Koch's opinion that bovine tuberculosis was a negligible factor in human tuberculosis was based, not on experimental work with a large amount of human material, but chiefly on the alleged extreme rarity of primary intestinal tuberculosis in Germany. He argued in the first place that one can assume with certainty that a case of tuberculosis has been caused by alimenta only in those instances where there is evidence of primary infection of the intestines, and secondly, that if man is susceptible to the bovine type primary intestinal tuberculosis should be of common occurrence, in view of the abundant opportunities for the transference of bovine bacilli through consumption of milk. This argument overlooked the possibility that bovine bacilli can traverse the intestinal mucosa without leaving in that tissue any trace of their passage.

THE ROYAL COMMISSION OF 1911

In this country tuberculosis of alimentary origin was certainly not rare, as necropsy records clearly showed. For example, Still in England concluded that in 29.1 per cent., and Shennan in Scotland that in 28.1 per cent., of tuberculous children primary infection had taken place through the intestines. It was obvious that this important question could not be left in doubt, and a Royal Commission was appointed. Its report in 1911 showed conclusively that Koch was mistaken in assuming that human beings ran little risk from infection with bovine bacilli. This type of bacillus was found to be the cause, not only of benign and localized, but also of severe generalized and fatal forms of tuberculosis, such as tuberculous meningitis and phthisis pulmonalis. But though the danger of bovine tuberculosis was thus so clearly demonstrated, no insistent and general demand arose in the country for a milk supply free from the living germs of tuberculosis. The belief originating with Koch that bovine bacilli produced at most only a mild form of the disease gave rise to the dangerous doctrine that a few bovine bacilli in the milk were desirable for their immunizing value against the more prevalent human tuberculosis, and for this reason opinion was divided on the advisability of eliminating all tubercle bacilli from milk.

The cases examined by the Commission, being to some extent selected and derived from London hospitals only, did not provide an accurate basis for inference as to the relative frequency and distribution of infection with the bovine and human types of bacilli. The inquiry was therefore continued by some of the investigators of the Commission (Eastwood, F. Griffith, and myself) with support from the Local Government Board and Medical Research Committee and Council, while in Scotland similar investigations were instituted by Mr. (now Sir) Harold Stiles. In recent years valuable contributions have been made by Munro, Blacklock, and Cumming.

RESULTS OF INVESTIGATIONS DOWN TO 1931

As last year in Edinburgh I summarized the results of English and Scottish researches I will on this occasion only repeat the main conclusions. These investigations have demonstrated beyond doubt that bovine infection is responsible for a considerable amount of human tuberculosis in Great Britain. The total number of human cases in England and Scotland in which the type of infecting organism had been determined down to the middle of 1931 was 2,825. These comprised 1,040 cases of phthisis pulmonalis examined during life, 464 necropsies on persons dying from various causes, and 1,321 cases of other forms of tuberculosis. Of the 1,321 cases of the non-pulmonary forms of tuberculosis—namely, cervical gland, bone and joint, genito-urinary, skin, and meningeal—466 (35.3 per cent.) were caused by infection with bovine tubercle bacilli. Of this number 365 were in children under 5 years of age, and of these 198 (54.2 per cent.) yielded bovine bacilli. In the later age periods the percentage of bovine infection progressively diminished. The number of cases in adolescents and adults, however, was by no means unimportant. In the English series, excluding the cases of phthisis pulmonalis and lupus, there were more than twenty-four persons over 16 years of age, some of whom died—namely, one of abdominal and general tuberculosis, two of tuberculous meningitis, and one of renal tuberculosis.

Of the different non-pulmonary forms of tuberculosis cervical adenitis gave the highest percentages of bovine infection—85.7 in England and 84.9 in Scotland in children under 5 years of age, and 45.7 for England and 73.6 for Scotland at all ages. Then follow lupus with 48.6 and 53.8 per cent. for England and Scotland respectively, meningitis with 30.1 per cent. for England, and bone and joint tuberculosis with percentages of 18 for England and 42.8 for Scotland. The examination of material obtained from necropsies has given percentages of 16.8 in an unselected series in England and 33.3 per cent. for Scotland.

PHTHISIS CAUSED BY BOVINE TUBERCLE BACILLI

In striking contrast to these figures for the non-pulmonary forms of tuberculosis are those for phthisis pulmonalis. Of 1,040 cases examined in England and Scotland only 2.3 per cent. were definitely attributable to bovine bacilli—0.8 per cent. of 492 cases in England and 3.6 per cent. of 548 cases in Scotland, not including one case in which human tubercle bacilli were also found. It is seen, therefore, that in phthisis pulmonalis, as in nearly all the other forms of tuberculosis, the percentage of bovine infection was higher in Scotland. These examples of phthisis of bovine origin, though relatively small in number, are very significant. Many of the patients gave a history indicating that they had been infected in early life through the alimentary tract. Six had had enlarged cervical glands removed by operation (incidentally these cases disprove the hypothesis that cervical gland tuberculosis of bovine origin in early life protects one from phthisis later), and others had had abdominal tuberculosis. These instances show conclusively, therefore, that persons infected in childhood with bovine tubercle

* Read in opening a discussion in the Section of Tuberculosis at the Centenary Meeting of the British Medical Association, London, 1932.

bacilli may in adult life develop phthisis pulmonalis due to this same bacillus, and may possibly spread bovine tuberculosis to other human beings and to animals through the agency of sputum.

One is now in a position to state that all the arguments advanced by Koch in support of his opinion that bovine tuberculosis is of little importance for man have been disproved.

DANGER AND INCIDENCE OF BOVINE INFECTION

It is clear that the bovine tubercle bacillus can produce all the different forms of clinical tuberculosis and can set up tuberculous lesions in every organ and gland indistinguishable from those caused by the common human tubercle bacillus. Moreover, the ability of the organism to produce the progressive and fatal forms, such as tuberculous meningitis and phthisis pulmonalis, though entering the body from the alimentary canal—a more difficult channel of infection than the respiratory tract, the usual channel for the human bacillus—shows that the bovine bacillus must have a virulence for man at least as great as that of the human type.

The statistics to which I have referred are based on results obtained over a continuous period of twenty years down to the middle of 1931, and with samples of human material gathered from widely separated localities in Great Britain. Every year during the twenty years which have elapsed since the Royal Commission pointed out the danger of a tubercle-infected milk supply cases of human tuberculosis of bovine origin have been discovered in various parts of the country. The Special Committee of the People's League of Health, in its survey of tuberculosis of bovine origin in Great Britain, estimated that about 2,000 deaths, mostly in children, are caused annually by the bovine tubercle bacillus, and that at least 4,000 fresh cases of bovine infection develop each year. The figures in my opinion underestimate the loss to the community in deaths and disease from this cause.

RECENT RESEARCH

In order to show how serious the menace of bovine tuberculosis continues to be at the present day I will give the results of some recent investigations. I have completed the examination of cultures of bacilli obtained from eighteen children who died this year from tuberculous meningitis, and of these strains six (33.3 per cent.) were of the bovine type. Two of the latter six children were 2 years old, one was 3, one was 5, one was 6, and one was 20; necropsies on two showed that the tuberculosis was of alimentary origin. I have also obtained strains of bovine bacilli from several cases of bone and joint and cervical gland tuberculosis in children, some of whom were under 2½ years of age. It is certain, therefore, that at the present time children are being infected with bovine bacilli which in years to come will produce in some of those who escape early acute fatal disease the most serious of all forms of human tuberculosis, both clinically and epidemiologically—namely, phthisis pulmonalis.

This statement is warranted by the results of sputum examinations which Munro and I in collaboration, and Cumming, have recently obtained. In Scotland we have this year discovered seven more cases of phthisis with only bovine bacilli in the sputum, making twenty-seven in all; and Dr. Cumming permits me to say that he has found altogether fourteen cases—twelve in the North of England and two in London—since he started his investigations in 1931. With my four the number of cases of bovine phthisis found in England is now eighteen. Of the forty-five cases twenty-nine were in women and sixteen in men.

MUTATION OF BOVINE TO HUMAN TYPE

The question may be asked whether the proportion of cases which one can by biological methods definitely attribute to bovine tubercle bacilli accurately represents the magnitude of the damage done by bovine tuberculosis, whether in fact some of the cases from which one obtains human bacilli may not originally have been caused by the bovine type. The possibility that bovine bacilli might change into human bacilli in the human body was first suggested by Lord Lister in 1901, but this conception exerted great influence only from the time when Behring and Roemer supported it on the ground of their experimental observations. The transmutation hypothesis has several distinguished adherents, notably Rabinowitsch, Calmette, and Much. As it has been the subject of correspondence recently in the *British Medical Journal* I have thought that it will be useful to discuss briefly the evidence for and against.

Numerous attempts have been made to change the type characteristics of tubercle bacilli by passage through the bodies of different species of animals. It may be said at once that all the experiments where particular care was taken to guard against contamination through casual infection with another type of bacillus have been uniformly negative. It is unnecessary to give details of these experiments, but I will mention a few of especially long duration to illustrate how persistently the different types of tubercle bacilli retain their special characteristics. Several strains of human bacilli were unchanged in cultural characters and virulence after residence in the bodies of calves for periods up to 512 days, and in two cows for 529 days and 2½ years. Bovine tubercle bacilli were passed through the bodies of chimpanzees, the experiment lasting 512 days, of dogs for a period of about three years, and of toads for nearly eight years, without any change occurring. Avian tubercle bacilli, typical in cultural characters and in virulence for fowls, have been recovered from the mammary gland of a goat six years after the animal was inoculated subcutaneously with a culture of this bacillus.

Although favourable conditions for the occurrence of mutation cannot be, or at least have not yet been, artificially contrived, it is possible that these may arise during the progress of a natural infection—for example, where bovine bacilli persist in the tissues of a human being into adult life, giving rise to chronic slowly progressive tuberculosis. If one assumes, as I think it is assumed by many, that all adult tuberculosis owes its origin to infection acquired in childhood, and that this primary infection is predominantly bovine, mutation seems the obvious explanation of the gradually diminishing frequency of the bovine type as age advances. There is, however, much clinical and pathological evidence against the view that all tuberculous infection dates from childhood, and bacteriological investigations have shown that infection in infancy, presumably too recent for mutation to have occurred, is largely with the human type of bacillus.

The lower proportion of bovine infections in adults than in children is explicable on other grounds. Bovine tubercle bacilli enter the body almost exclusively by way of the alimentary tract, and since milk is the vehicle of infection the proportion of cases due to bovine bacilli is highest in children, whose chief article of diet is, or should be, milk. Secondly, a certain number of bovine infections disappear before adult age is reached, as in children bovine bacilli may cause death from general tuberculosis or tuberculous meningitis; furthermore, many of the forms of tuberculosis to which they give rise are curable and the bacilli die out. The preponderance of human bacilli in phthisis pulmonalis, which is the

principal form of adult tuberculosis, is due to the fact that phthisis is usually caused by human bacilli which have been inhaled.

Assuming that bovine bacilli can become transformed into human bacilli in the human body one would expect, unless the change is abrupt and complete, to meet with intermediate forms. Now it has been found that strains of tubercle bacilli of human origin do not always correspond exactly either to the human or to the bovine type, though clearly belonging to the mammalian group. These atypical strains have been considered by those who uphold the doctrine of the convertibility of tubercle bacilli to be intermediate—that is to say, in a transitional stage between bovine and human. For the reasons which I have stated elsewhere this view is probably incorrect. They represent, in my opinion, merely temporary or quasi-permanent variants of one or other of the two forms; they retain characteristics of the types from which they have been derived, and are often capable of complete reversion to the original type.

While there is no certain evidence that bovine bacilli change into human bacilli during residence in human tissues, there is, on the other hand, plenty of evidence that these bacilli can retain their characteristic properties during the whole course of a case of tuberculosis. For example, bovine strains, typical in every respect or only slightly below the normal virulence, have been obtained from seventeen cases of lupus which had lasted from thirteen to fifty-two years (average twenty-two years) and from many cases of phthisis in the adult which dated back to childhood. It is just in the latter form of the disease that one would expect the conditions to be most favourable for mutation. There is therefore no direct evidence to support the view that bovine tuberculosis is responsible for more cases of human tuberculosis than can be ascertained by the ordinary bacteriological methods.

The position disclosed by the facts which I have presented is sufficiently serious—without exaggeration—to demand the greatest efforts to prevent the grave loss through death and disease from this cause, and to bring about the eventual extinction of bovine tuberculosis, not only for economic and agricultural reasons, but also in the interests of human health.

THE ROLE PLAYED BY BOVINE TUBERCLE BACILLI IN HUMAN TUBERCULOSIS*

BY

BRUNO LANGE

ROBERT KOCH INSTITUTE, BERLIN

At the Congress on Tuberculosis in London in 1901, Koch, as a result of experiments conducted by him, together with Schütz, on cows, asserted that bovine tubercle bacilli were of virtually no importance for human beings. He abandoned this extreme standpoint later, but, in Washington in 1908, he still declared that, while he regarded it as necessary to combat bovine tuberculosis for sound agricultural and economic reasons, he did not desire to see this done in connexion with the battle against human tuberculosis without further grounds. As a result of Koch's initiative, and doubtless also because of the opposition which his point of view evoked among many physicians and investigators, studies of the types of tubercle bacilli occurring in man and animals have been carried on in all parts of the world. Among such studies special importance must be ascribed to those carried on by the British Royal Commission, by the Reichsgesundheitsamt, and by Park and Krumwiede. I should like to mention also that Robert Koch himself evinced very great interest in the reports of the British investigators. Neufeld tells us that the Royal Commission's report lay open on Koch's desk when he left his institute for the last time. To-day, when the result of the many investigations to which I have referred is available, we can form a fairly dependable conclusion concerning the very practical problem of the importance of bovine tuberculosis for human beings.

THE BOVINE BACILLUS

First of all, it is to be emphasized that it has been possible since Koch's day to confirm thoroughly his opinion that bovine tubercle bacilli can be definitely distinguished from human bacilli by laboratory investigation, and that the characteristics of the types are essentially constant. This fact is of the greatest importance, since it gives us a sure basis for determining the danger which menaces human beings from bovine tubercle bacilli. If the view, still held by some writers, were correct, that the characteristics of type are not constant, and that the one type can metamorphose itself into the other, and, in particular, that bovine bacilli can change into human bacilli in the human body, we should be obliged at the very outset to abandon the attempt to form any judgement as to this source of danger, and to leave the question open as to whether, following the Behring theory, human phthisis pulmonalis is due in the last analysis to the drinking of milk infected with tubercle bacilli in the first few years of life.

In diagnosing types in the Robert Koch Institute we proceed to-day in the following manner:

We secure pure cultures from tuberculous specimens, so far as possible, by the direct method—using the antiformin process or the Loewenstein-Hohn method—and also at the same time by the inoculation of guinea-pigs. As medium for the first culture we employ the egg culture without glycerin, described by Dorset, and alongside it Lubenau's culture with an addition of serum. From the pure culture secured directly by the first method or by the inoculation of guinea-pigs we inoculate the so-called differential culture mediums—bovine serum with and without glycerin, glycerin-agar, glycerin broth. If the result is such a development of the strain as has been shown by the investigations of the Reichsgesundheitsamt and the British Royal Commission to be characteristic for the bovine type, the pathogenicity of the strain is tested on rabbits. We prefer here, following Oehlecker, intravenous inoculation with 1/100 mg. of glycerin broth culture, with which results are achieved more quickly than by subcutaneous inoculation. Along with this we employ a test worked out by Toda in my laboratory, in which three strains to be tested are compared with a bovine strain of known high virulence through intracutaneous inoculation of 1/100,000 mg. in all four legs of the same rabbit. Bovine strains of typical virulence give rise to especially great primary infections of the skin, and above all a caseous tuberculosis of the regional lymphatic glands. Human strains never do this. Through the above method one arrives quickly—at most in two months—at a definite conclusion.

The diagnosis of the type is always difficult if one has to do with bovine bacilli of greatly weakened virulence, such as not infrequently occurs in cases of so-called external tuberculosis of human beings, especially in lupus. But it has been possible for me, with only very rare exceptions, to reach a definite decision as to the type. I share the opinion of Stanley Griffith and Neufeld that intermediate forms between the two types do not exist, but rather that the tubercle bacilli strains described by Lydia Rabinowitsch and other authors as intermediate forms are merely variants of the one or other type, or else mixed cultures of both types.

After these preliminary remarks concerning the method of diagnosing types, I will now endeavour, basing on all

* Read in opening a discussion in the Section of Tuberculosis at the Centenary Meeting of the British Medical Association, London, 1932.

Frequency of Bovine Tubercle Bacilli in Human Tuberculosis in Germany, Compared with Percentages from Other Countries*

Forms of Tuberculosis	Total Number of Cases	Below 5 Years		From 5 to 16 Years		Over 16 Years		No Age Given		Total Number of Cases		†Percentage Bovine	England	Scotland	All Other Foreign Countries
		Human	Bovine	Human	Bovine	Human	Bovine	Human	Bovine	Human	Bovine				
1. Generalized, and meningitis tuberculosa	201	136 (+ 2)	10	23	5	22	0	3	0	184 (+ 2)	15	**8.4**	*30.1*	*13.3*	*11.9*
2. Bone and joint	87	20	0	30	3	32	1	1	0	83	4	**4.6**	*18.0*	*42.8*	*1.6*
3. Cervical glands‡ ...	94	15	10	24	10	34	1	—	—	73	21	**22.3**	*45.7*	*73.6*	*25.6*
4A. Abdominal	116	28	14	8 (+ 1)	11	32 (+ 1)	11	10	—	78 (+ 2)	36	**32.7**	—	—	*35.9*
4B. Necropsies. Portal of entry: alimentary tract (English authors)	—	—	—	—	—	—	—	—	—	—	—	—	*84.6*	—	—
5. Genito-urinary	24	—	—	1	0	23	0	—	—	24	0	**0**	*17.4*	*9.1*	*5.3*
6. Lupus	160	17	3	36	13	61 (+ 2)	13	12	3	126 (+ 2)	32	**21.3**	*48.6*	*53.8*	*9.9*
7. Pulmonary and bronchial glands	345	44	2	6	0	281 (+ 2)	0	10	0	341 (+ 2)	2	**1.2**	*0.8*	*3.8*	*0.3*
8. Phthisis of adults (included in No. 7)	283	—	—	—	—	281 (+ 2)	0	—	—	281 (+ 2)	0	**0.7**	—	—	—
9. Phthisis of adults probably exposed by their profession to infection by tuberculous cows (milkers, etc.)§	40	—	—	—	—	—	—	—	—	32	8	**20.0**	—	—	—

* So-called atypical strains are not considered.
† Mixed infections with both types are counted as bovine.
‡ A few cases of axillary gland tuberculosis are included in this category.
§ Latest investigations of the Robert Koch Institute.
(The figures in parentheses denote mixed infections with both types.)

available experience in this field, to characterize the danger that menaces human beings from bacilli-excreting cattle.

Its Occurrence in Man

In discussing the statistics that give us an idea of the frequency of bovine infection in man, I lay chief weight on the results of the investigations conducted in Germany. I shall refer only briefly to the results in other countries.

A comparison made of the frequency of bovine infection in Germany with its frequency in Great Britain, dealt with by Stanley Griffith, is especially instructive. The above table gives a general survey of the findings.

In Germany there were found: 8.4 per cent. of bovine infections in 201 cases of generalized tuberculosis and tuberculous meningitis, 4.6 per cent. in 87 cases of tuberculosis of the bones and joints, 22.3 per cent. in 94 cases of tuberculosis of the lymphatic cervical glands, 35.8 per cent. in 106 cases of abdominal tuberculosis, no bovine infection in 24 cases of genito-urinary tuberculosis, and 21.3 per cent. in 160 cases of lupus. In 345 cases of tuberculosis of the lungs and bronchial glands somewhat more than 1 per cent. of bovine bacilli were found. Of these 345 cases, 281 were pulmonary tuberculosis of adults, and in only two of these could bovine bacilli be found, and in both cases they were in company with human bacilli—that is, only 0.7 per cent. in all.

I have made a separate category of forty cases of pulmonary tuberculosis investigated in my laboratory in the last few years, all of them patients whose occupations—milkers, stable-boys, etc.—had exposed them shortly before they became ill to infection from tuberculous cows. In eight of these cases bovine bacilli were found in the sputum—that is, in the strikingly high percentage of 20. This number does not include one case of pulmonary tuberculosis in which both human and bovine bacilli were found in the sputum.

Interpretation of Statistics

While the figures of non-German authors in general approximate to those given for Germany, the percentages reported for England and Scotland are considerably higher, those for Scotland mainly higher than those for England.

It is difficult to calculate the frequency of bovine tuberculosis in man from the figures reported, since a frequency of the different forms of the disease which is not definitely known to us must lie at the basis of any such calculation. It is to be borne in mind, for instance, that in Germany, and doubtless in other civilized countries, some five to six times as many persons die of pulmonary tuberculosis as of all other forms of tuberculosis combined. It must further be borne in mind that not a few of the cases considered were chosen for investigation because there was a clinical suspicion of infection with bovine tubercle bacilli. If we confine ourselves to the lessons taught with certainty by the figures reported, we find the following:

1. Bovine tubercle bacilli were found to be the cause of tuberculosis of man in its most varying forms.

2. The menace of bovine infection is much greater in children than in adults, especially in regard to adult pulmonary tuberculosis.

3. The distribution of bovine infection differs in no slight degree in different countries.

The fact that bovine infection is much more frequent in children than in adults can easily be explained if we consider that milk, the most important source of infection, is one of the chief foods of the child—a circumstance that no longer applies to the adult. What happens when adults—as, for example, in the course of their daily work—are exposed to infection by tuberculous cattle, and especially during the critical period between the ages of 15 and 20, is clearly shown by the findings of the Robert Koch Institute in recent years in the case of forty milkers, stable-boys, etc. Here a percentage was established for bovine tuberculosis which comes precariously close to that of intestinal infection of children in Germany.

The assumption that bovine infection even distantly approximates infection with human bacilli in frequency can be dismissed from the start, even for a country in which tuberculosis of cattle is very prevalent and the necessary safeguarding measures have not been taken; for, in the first place, man is exposed to infection by human bacilli during the whole course of his life, whereas the period of exposure to bovine infection is limited in the main to the first years of life; and secondly, numerous experiments, as well as observations in humans, have shown us that infection through the alimentary tract—as is the case with bovine tuberculosis—is set up with much greater difficulty than infection through the respiratory tract, which is almost without exception due to human bacilli. In this connexion, however, it must be taken into consideration that cow's milk containing bacilli as a rule transmits a greater number of tubercle bacilli, whereas the number of bacilli that reach the lungs through inhalation is always small.

The striking difference in the frequency of bovine infection as found in different countries can be explained by the varying extent of distribution of bovine tuberculosis and by the degree of hygiene maintained in the milk supply of the population.

ITS RELATIVE DANGER

If what has so far been said points to a much more frequent infection with human than with bovine bacilli in man, it would nevertheless be wrong to assume that an infection with bovine tubercle bacilli is less harmful than an infection with human bacilli, as a great number of investigators and physicians, following Robert Koch, still believe to-day. On the contrary, I am of the opinion that the sum of the observations bearing on this problem furnishes no proof whatever for such an assumption. As late as 1908 Robert Koch, speaking before the Tuberculosis Conference in Washington, cited as proof of the lower virulence of bovine tubercle bacilli the fact that up to then the presence of bovine bacilli in the sputum had not been established with certainty in a single case of pulmonary tuberculosis. This argument has been definitely refuted by the most recent observations of W. T. Munro, A. Stanley Griffith, and myself. A further circumstance disproving a lower pathogenicity of the bovine bacilli for mankind is the lack of any noticeable difference in the course of the infection resulting from the type of the bacillus. The course of an intestinal tuberculosis or a phthisis caused by bovine bacilli, to mention an example, is not less severe than that of the same diseases when caused by human bacilli. If it is open, a "bovine phthisis" in man has about the same mortality as the disease caused by human bacilli. Neither can the fact that bovine tubercle bacilli of reduced virulence have frequently been found serve as proof for the assumption that the bovine bacilli have a lower pathogenicity, as, on the other hand, human bacilli of reduced virulence are also found on occasions—in the case of lupus quite as frequently, in fact, as are the bovine. Other arguments that have been cited as proof of the lower pathogenicity of the bovine bacilli for mankind have quite as little foundation in fact, as I have pointed out on former occasions.

Although we must therefore agree with Robert Koch in his demand that the battle against tuberculosis be concentrated primarily against infection from man to man, in view of the much lower frequency of bovine infection as compared with that of human, it is my conviction that the widespread opinion still existing to-day that infection with bovine bacilli is comparatively harmless for mankind must be rejected as having no foundation in fact. I am in this respect in perfect accordance with A. Stanley Griffith, who has been stressing this view repeatedly for many years.

Taking into consideration all the known facts concerning bovine infection, we have every reason to employ all the means at our command to combat this source of tuberculosis in man. We are all the more bound to such a procedure by the fact that we are able to institute much more effective measures against the transmission of bovine tubercle bacilli to human beings than are at our disposal for the prevention of tuberculous infection from man to man.

The view held by some physicians to the effect that a light bovine infection acquired in childhood might even be useful to a certain degree as a means of developing immunity against later infections, represents, in my opinion, a dangerous argument. Quite apart from the fact that the protection resulting from an infection is thoroughly problematic, the additional fact that no one can predict just what may develop in later years out of even a slight infection with bovine bacilli should prevent anyone from drawing conclusions on the strength of this hypothesis affecting our actions in practice.

PREVENTIVE MEASURES IN GERMANY

In what follows I wish to call attention to the methods used in Germany against bovine infection in man.*

Percentage of Cattle Affected

In regard to the extent of bovine tuberculosis in Germany, the rate of distribution varies greatly in the different parts of the country. In some districts in Germany we find only a low percentage of open tuberculous animals, even as little as 0.5 per cent.; in other districts, however, it is as much as 10 and 20 per cent. By far the greater part of the tuberculous infections are open cases of pulmonary tuberculosis, aggregating even more than 90 per cent. The proportion of udder tuberculosis is very small, as it amounts to only about one-thirtieth of the cases of pulmonary tuberculosis. Comparatively speaking, a still smaller part is played among the total number of infections by tuberculosis of the womb and intestinal tract. The combat against bovine tuberculosis in Germany is carried on partly through legislation and partly through voluntary measures under State supervision.

The Extermination Method

We have the "Viehseuchengesetz" (animal contagious disease law), which came into effect in 1912. Under it the owner of animals is under obligation to report any externally recognizable tuberculosis occurring among his stock. Of much greater importance in practice is the "Tuberkulose-Tilgungsverfahren" (method for exterminating tuberculosis), which has been in existence for about thirty years. The farmers and agricultural associations voluntarily participating in the exterminating method must submit to the following regulations:

1. Their herds must undergo a clinical examination at least once a year by a veterinary surgeon chosen by the authorities. Badly infected stock must, in the interests of the owner, be examined twice a year if possible. In addition, a bacteriological examination for tubercle bacilli must be made at least three times a year of a test taken from the combined milk yield of all the cows in the herd.
2. The owner is bound immediately to follow the directions of the examining veterinary surgeon concerning the isolation and other methods of treatment of any animals that appear suspect.
3. The calves must be separated from their mothers when they are two days old, and must be fed either with boiled milk or with raw milk from medically tested selected cows.
4. The costs of this procedure are borne in part by the State and in part by an assessment of the owners of the stock. The owners are recompensed for animals killed by order of the veterinary surgeon, one-third of the payment coming from the State and two-thirds from the provinces, out of the dues paid by the owners of the stock.

The Results

More and more agricultural enterprises are participating in the "method for exterminating tuberculosis" every year. In Prussia about 20 per cent.—that is to say, a little more than 2,300,000 of the total number of cattle—are at present included in this procedure. These 20 per cent. include the most severely contaminated herds and most of the large dairies and breeding associations of importance for the general milk supply, so that practically

* The following information was furnished by Dr. Scharr, director of the Bacteriological Institute of the Chamber of Agriculture for the Province of Brandenburg, and by Dr. Wiemann, Councillor in the Ministry for Agriculture.

50 per cent. of the total danger sources are thus under observation. It may be of interest to state that in the year 1930 a total of 81,000 animals were reported ill and suspect, 43,880 head of cattle were killed in Prussia as a result of this method, and over nine million marks were paid the owners of the slaughtered animals in the same year as compensation. The owners of herds are in ever greater degree learning to appreciate the economic advantage resulting from the elimination of all tuberculous cattle. This growing interest, coupled with propaganda stressing the value of sending the cattle to pasture as compared with the unhealthy process of keeping them stabled, is resulting in a steady increase in stock free from tuberculosis.

Milk Inspection

Mention should be made of still another extremely important measure against the infecting of man with bovine tubercle bacilli—namely, the official inspection of the milk, and the process of pasteurizing and other methods of applying heat in order to destroy any disease germs contained therein. The new "Reichsmilchgesetz" (national milk law) of 1930 contains drastic provisions concerning the inspection of stock, the methods of milk production, and the sale of milk. An especially important provision of the milk law for decreasing the menace of infection is that every cow furnishing milk to be sold as of certified high quality must come under the scope of the "tuberculosis exterminating method," and that it is also prohibited to use the milk for human consumption, even when boiled, of cows suffering from any form of open tuberculosis or even highly suspect. Another factor in the prevention of infection with bovine tubercle bacilli is the practice, quite common in Germany, of regularly boiling milk for private consumption, especially in the case of milk intended for children.

It is to be hoped that the measures here described will bring about in the not too distant future a reduction to a minimum of the danger that menaces mankind from tuberculous cattle.

IMPORTANCE OF RESEARCH

In conclusion, I should like to point out that the researches being carried on in Germany and other countries into human tuberculosis caused by bovine bacilli are important, not merely as a criterion for the dangers of the bovine bacillus for man, but also as a means of shedding light on many other important tuberculosis problems. This is especially so of the most recent observations on bovine bacilli in the sputum of human adults. Whereas according to the case history at least one-half of the cases of phthisis reported by Munro and Griffith must have developed from an infection acquired many years earlier, in childhood, the cases of pulmonary tuberculosis examined bacteriologically by me are probably all due to an infection acquired in adult years. There is no other explanation for the fact that of my cases of phthisis which were proved or suspected to have been exposed to bovine infection as adults, 20 per cent. were infected with bovine bacilli, whereas in the sputum of 281 other phthisis patients formerly examined in Germany, bovine bacilli were found to be the cause of the infection in only two cases—that is, 0.7 per cent.—and even in these two cases human bacilli were also present. Naturally our figures are as yet too scanty to permit us to form a definite opinion. I am convinced, however, that a systematic continuation of such research work into "bovine phthisis" will furnish us with valuable information concerning a problem which is to-day again claiming general interest—I refer to the question of the importance of childhood infection on the one hand, and of adult infection on the other, in human pulmonary tuberculosis.

THE END-RESULTS OF THE TONSIL AND ADENOID OPERATION IN CHILDHOOD AND ADOLESCENCE*

BY

J. ALISON GLOVER, O.B.E., M.D., M.R.C.P., D.P.H.

AND

JOYCE WILSON, M.B.

We have been asked to deal with this subject particularly from the statistical point of view. First, let us define two things:

1. For brevity, the single word "tonsillectomy" will be used throughout this paper to mean the double operation for the removal of tonsils and adenoids.

2. "End-result" means anything which may result *after convalescence* from the operation is *complete*; therefore all the more immediate risks of the operation are excluded from this paper.

The assessment has been attempted by many authorities, but in view of the vast number of tonsillectomies now performed, it would seem that no more important or urgent subject for a centenary discussion in this Section could have been chosen.

Increased Use of Tonsillectomy

Table I and Diagram 1 show the number of elementary school children officially recorded by the education authorities as operated upon in England and Wales and in London for a number of years. While in London the

TABLE I.—*Number of Tonsillectomies Officially Recorded Annually in Public Elementary School Children for London and England and Wales Respectively.*

	London	England and Wales
1923	7,656	47,685
1924	8,051	49,436
1925	12,179	60,871
1926	13,165	68,250
1927	14,843	80,548
1928	17,372	92,171
1929	17,186	97,518
1930	18,119	109,738
1931	18,178	—

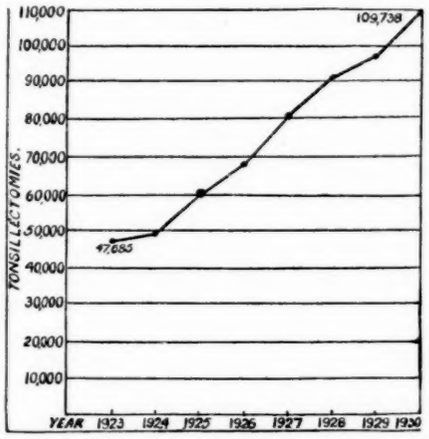

DIAGRAM 1.—Number of tonsillectomies performed on elementary school children in England and Wales annually, 1923 to 1930. (Board of Education: Annual Reports of the Chief Medical Officer.)

curve shows some evidence of becoming stabilized, the increase in England and Wales is still rapid. This rapid increase (to two and one-third times as many in 1930 as in 1923) has occurred in spite of repeated warnings from the

* Read in opening a discussion in the Section of Oto-Laryngology at the Centenary Meeting of the British Medical Association in London, 1932.

Chief Medical Officer of the Board of Education in his annual reports (especially that of 1923[11]), that these operations should only be undertaken when absolutely necessary, and that many cases of hypertrophy do not require operative treatment. Maxwell[1] estimates that 250,000 tonsillectomies are performed in this country yearly.

The School Medical Officer for London[2] says that 6.7 per cent. of all childen examined in the statutory age groups (5–8–12) were referred for operation, and that the better facilities for conducting operations have doubtless influenced the examiners in referring cases, no less than the parents in following their advice. The entrant infants provide by far the largest quota—10.3 per cent. boys and 9.2 per cent. girls, compared with 5.4 per cent. 8-year-old boys, 6 per cent. 8-year-old girls, and with 3.2 per cent. 12-year-old boys and 4 per cent. 12-year-old girls. The Council's aurist examined 1,361 "representative" children; 174 had already been operated upon for adenoids, and of the remainder, in only 237 (17.4 per cent.) was the nasopharynx found to be normal. Adenoids were present in 54.9 per cent. with or without tonsillar enlargement, and 15 per cent. had enlarged or septic tonsils. Including those whose adenoids had already been removed, adenoids were or had been present in 67.7 per cent. When a great authority states that in only 17.4 per cent. of "representative" children is the nasopharynx "normal" it is clear that the term is not used in the ordinary dictionary sense, but that a hypothetical ideal rather than a "normal"* nasopharynx is the standard he employs.

Age Incidence of Operation

Although the function of the tonsil is unknown, its natural maximum before, and its atrophy after, puberty suggest that the age at which the operation takes place may be of great importance in the result. Another diagram (not reproduced) compares by percentages the ages of operation in three series: 500 Children's Hospital patients at Great Ormond Street,[3] 1,001 elementary school children at Newcastle,[4] and the 502 cases reviewed by the Medical Committee of the Board of Education[5] in their Interim Report on Adenoids and Tonsils. In each the maximum is at 6 years; 6 to 7 years is also the age of maximum incidence of the operation in America. Tonsillitis reaches its maximum age incidence at about 10 years and acute rheumatism at 7 to 8.

We estimate that in England and Wales the number of elementary school children who are tonsillectomized before reaching the age of 14 now amounts to 14 per cent. of the whole, and the percentage is rising rapidly. In London it exceeds 33 per cent. In the wealthier public schools of this country the percentage is far higher, and percentages of 65 or over of children tonsillectomized before entry are common.

For twenty-six large boarding schools, with a total child population of nearly 12,000, the average figures are 55 per cent. for boys and 48 per cent. for girls, and are still rising rapidly, the increase during two years (1930–1) being 2.6 per cent. for boys and 4.7 per cent. for girls. These percentages for the children of the wealthy and professional classes are equalled in the United States, where Collins[6] found that 61 per cent. of the children, from 10 to 14 years, of medical officers of the Army, Navy, and public health services had been tonsillectomized. At a recent meeting[1] in London of forty-six male medical students and recently qualified medical men, it was found that exactly 50 per cent. had been tonsillectomized.

A high proportion of tonsillectomized children is not, however, always a class distinction in an educational institution. A large boarding school with about 900 boys (ages 11.5 to 15.5) of the public elementary school class, where the medical attention is exceptionally good, has now 45.6 per cent. tonsillectomized, whereas a famous public day school with 700 boys has but 44.5 per cent. of them tonsillectomized. In Minnesota,[7] of 1,328 high school students (11–20 years), 41.3 per cent. of the boys had had their tonsils removed, the corresponding figure for the girls being 33.3 per cent.

The higher incidence of tonsillectomy upon males seems general, and is remarkable as the incidence of tonsillitis and also of acute rheumatism is higher upon females in similar environment.

One-third of 12,530 young white women students who entered the University of California[8] between 1920 and 1929 had had an operation for the removal of tonsils; one-third were thought to have normal tonsils, and the remaining one-third had "pathologic" tonsils, including remnants of tonsils or buried or projecting tonsils.

In contrast with these high percentages, Dr. Gustav Seiffert,[9] the medical officer of health for Munich, told one of us this spring that in that city not more than 0.5 per cent. of secondary school children have been tonsillectomized, whilst in the country districts around hardly any children have had the operation. Even in the country districts of south-eastern Missouri only 2 per cent. of school children are tonsillectomized.

Assessment of End-Results

Less than half a century ago one of us went to a good preparatory school of fifty boys. That period of life is recalled with extraordinary vividness, and it is almost certain that of those boys not one had had tonsillectomy; nor is it likely that any of the 650 boys of the subsequent public school had had the operation; old school photographs do not reveal any greater prevalence of what is sometimes called the "adenoidal facies" or "mouth breathing" than is seen to-day, and the incidence of infectious disease and particularly of middle-ear disease was certainly no greater. The *Times*, in its recent excellent series of articles on "Fifty Years Ago," included one on changes in public schools, but the author did not mention that, whereas fifty years ago a tonsillectomized pupil was an extreme rarity, to-day he is in the majority.

When we contemplate this change which has occurred in one generation we find that, since we were children, a new disease (curable only by surgery) has apparently arisen, a disease of which the incidence varies from 0.5 per cent. in the town of Munich to 14 per cent. in English elementary school children and to 65 per cent. at a wealthy public boarding school. Although tonsillitis seems to fall fairly equally upon the rich child and the poor, yet tonsillectomy falls four or five times as heavily upon the rich, and when we hear that in only 17 per cent. of children is the nasopharynx normal, it certainly seems time to pause and reckon up the end-results of tonsillectomy. Especially is this felt when it is considered that our experience so far as it has gone, in the highly tonsillectomized public schools in this country, agrees generally with Cunningham's[8] carefully controlled observations in Californian students. She states that the group of tonsillectomized students gave a history of higher incidence of all illnesses and operations than did either the group with normal tonsils or the group with "pathologic" tonsils, and, further, that the proportion of the amount of illness reported before and after tonsillectomy suggested that the removal of tonsils had little influence in lessening the susceptibility to most infections. No impartial observer would deny that in certain cases tonsillectomy is a valuable operation with most gratifying end-results. "In a properly selected case there is no single operation in children's medicine more successful or that shows such dramatic results as that of tonsillectomy" (Paterson[3]). By a strange irony the conspicuous success of the operation in such cases has brought about its vain repetition in so many doubtful cases as to imperil its reputation and render it difficult to believe

*Average or mean of observed quantities, usual state or level, *Concise Oxford Dictionary*, 1929.

that there can be justification for so widespread an attack upon a normal structure of the body (Paton[10]).

Assessment of the end-results of the vast numbers of tonsillectomies now performed in children is rendered difficult by the variety of diseases for which the operation is performed, by the vague criteria for operation both local and general, and by the difference of opinion as to the most appropriate age to operate. Moreover, the difficulty of marshalling adequate controls is so formidable that fully to discuss it might occupy this whole paper. Shortly, it involves that for every separate condition the age of operation must be taken into account, together with an adequate control series of patients suffering from the same condition but untonsillectomized, whilst for every condition (save only disease of the tonsil itself) a second control series of patients suffering from the same condition but with normal tonsils will be required. Further difficulty is introduced by imperfect tonsillectomy, for in most conditions—especially in focal sepsis—remnants of tonsils are more dangerous than the whole unoperated tonsil, and as a large number of operations leave tonsillar remains (49 per cent. according to McLaggan,[11] 53.8 per cent. to Paton,[12] 41 per cent. to J. P. Clark,[13] 73 per cent. to Rhoads and Dick[14]), this must be provided for by showing patients with remnants either in a separate control, or including them with the unoperated morbid tonsils control series.

CRITERIA FOR OPERATION

Owing to the vagueness of criteria for operation in many cases, almost any series of tonsillectomies will contain in itself three classes of case: "X," those patients in whom it is certain the tonsils are diseased; "Y," those in whom there is a reasonable doubt as to the tonsils being diseased; and "Z," those in whom tonsillectomy is done as a preventive or curative measure, although perhaps, apart from a slight hypertrophy, the tonsils appear healthy. The proportions in which these classes are present in any series will therefore vary greatly. The Great Ormond Street Hospital[3] series would, for example, probably contain a far larger proportion of the "X" class than a series composed of 500 tonsillectomized preparatory or public school boys, many of whom would probably be of the "Y" but most of the "Z" class. In any comparison between a series of tonsillectomized children and any control series, one must remember that the child who is often ill is the more likely to be operated on.

Much work has been done on the subject in America, where the labours of A. D. Kaiser of Rochester, N.Y.,[15] R. L. Cunningham,[8] and Collins and Sydenstricker[6] are especially noteworthy. In England the assessment of end-results of tonsillectomy in children has been mainly as to its effects on the incidence of rheumatism, chorea, and carditis, and although the numbers investigated have been smaller than the American, good work has been done by many—Campbell, Close, Fordyce, Gray-Hill, Hunt, R. Miller, McSweeney, Osman, Poynton, Sheldon, A. P. Thomson, Vining, and Warner, to mention but a few. If, on account of the differences in criteria for operation and in control, these many studies can scarcely be compared or treated statistically, we can take the synoptic view, and console ourselves with Stephen's[39] words: "All really important matters are decided, not by a process of argument worked out from adequate premisses to a necessary conclusion, but by making a wise choice between several possible views."

The divergence of these "several possible views" is, indeed, very great and by no means new. Ten years ago, for example, H. S. Sington,[36] studying from the point of view of the general practitioner the end-results of complete tonsillectomy in 53 children under 10 years, came to the conclusion that once convalescence after the operation is complete, the child's health is so greatly improved that the practitioner has hardly ever to attend him again; and that the child is not so liable to other and fresh illnesses as one who retains this lymphatic tissue. In the same year, W. W. Stacey,[40] working upon 235 cases, and excluding the end-results in 66 children who had no symptoms but in whom the operation was performed on physical grounds of enlarged tonsils and adenoid growth alone, stated: "After making every allowance we can only show 50 per cent. of success with a technique as perfect as surgery can be. . . . I am perfectly clear in my mind . . . that operative measures should only be adopted when all else fails."

The last ten years have seen great changes in opinion as to the criteria for tonsillectomy. The adenoidal facies has been shown to have little connexion with adenoids, the "aprosexia," so often attributed to adenoids, being really a toxaemia produced by mild but continued antral or ethmoidal sinusitis, or both together. Doubt has been cast upon its value in preventing frequent colds, and chronic mild sinusitis is now considered by some a more important cause of these. Cleminson[37] has demonstrated the importance of sinusitis in children, and such papers as those of Bedford Russell,[38] Layton,[35] and Warwick James and Hastings[34] must modify opinion still further.

Different Indications for Tonsillectomy

We can obtain a fair general idea of the relative frequency of the different indications for operation in the vast bulk of tonsillectomies now done under the medical treatment schemes of education authorities from a table given by W. M. Ash,[16] showing the indications in 1,691 cases. Of these children 20 per cent. were operated on for frequent sore throats and tonsillitis; 12 per cent. for frequent colds; 12 per cent. for chest conditions; 11 per cent. for enlarged turbinates (10 per cent. of these having associated deviated nasal septum); 11 per cent. for earache and obstructive deafness; 4 per cent. for tubal catarrh; 6 per cent. had otitis media; 6 per cent. enlarged cervical glands; 4 per cent. had rheumatic conditions; 9 per cent. "systemic and general conditions"; 3 per cent. eye conditions; 4 per cent. "reflex conditions."

Thus, the indications in about 44 per cent. of the operations were frequent infections of throat, nose, or chest; in 20 per cent. deafness or ear trouble, and in 4 per cent. rheumatism—in all about two-thirds of the cases. Perhaps the end-results in such cases seem somewhat easier to assess statistically than the end-results of operations done for "systemic and general conditions."

Epidemiological Observations in Public Boarding Schools

The records (as far as they have gone) of sickness in the schools co-operating in the investigation into school epidemics seemed to afford an opportunity to estimate provisionally the effect of tonsillectomy on the incidence of colds, sore throats, and ear disease. These records of all cases of sickness entailing one or more days' loss of school work relate to two and one-third years in a population of some 14,000 pupils, for the most part between the ages of 13½ and 18 years, in twenty-seven large boarding schools and two large day schools. Slightly more than half of the pupils have been tonsillectomized. We gratefully acknowledge the kind permission of the Committee of the Medical Research Council to use some of these interim findings.

Full study of "recurrent" colds and sore throats occurring in the same individual must await the completion of the inquiry, and we wish to stress the fact that

these findings are provisional, and may be modified by the experience of subsequent years.

DISEASE INCIDENCE IN THOSE WITH AND WITHOUT TONSILS

The relative incidence on tonsillectomized and non-tonsillectomized pupils of infections was studied in the following instances:

1. Influenza, nasopharyngeal catarrhs, tonsillitis, bronchial catarrhs, bronchitis, and pyrexia of uncertain origin, in all the schools during the Lent term of 1932—which was distinguished by a large epidemic of influenza;

2. Influenza in one school which had a specially high attack rate of influenza during the Lent term, 1932;

3. Epidemic tonsillitis and febrile nasopharyngeal catarrhs during three epidemics in three different schools in three different terms;

4. Measles in three epidemics at different schools;

5. Scarlet fever, rheumatism, otitis, pneumonia, and appendicitis for all schools for the whole two and one-third years.

NASOPHARYNGEAL AND INFLUENZAL INFECTIONS

1. The Lent term of 1932 brought a sharp epidemic of influenza to most schools, accompanied by the usual trailers—tonsillitis, febrile catarrh, etc. In the boys' boarding schools there were 8,263 boys (4,552, or 55 per cent., tonsillectomized), and the attack rates were as follows:

TABLE II.—*One Term Attack Rates: Boys' Boarding Schools Only. Lent, 1932*

Disease	Tonsillectomized Boys	Non-tonsillectomized Boys
Influenza	26.7 per cent.	27.3 per cent.
Tonsillitis	5.3 ,,	4.8 ,,
Febrile nasal catarrh	5.7 ,,	5.6 ,,
Afebrile nasal catarrh	3.7 ,,	2.9 ,,
Bronchial catarrh	0.9 ,,	0.8 ,,
Pyrexia of uncertain origin	1.2 ,,	0.7 ,,
Total nasopharyngeal infections:	43.5 ,,	42.1 ,,

This close correspondence was exactly paralleled in the girls' schools, where the influenza attack rate was 11.50 per cent. in tonsillectomized, and 11.56 per cent. in non-tonsillectomized, the total nasopharyngeal infection rate being 61 per cent. and 62.1 per cent. respectively.

2. In the school which had a particularly high attack rate of influenza there were 579 boys, 300 (51.8 per cent.) being tonsillectomized; 361 boys were attacked by influenza, and 44 had two attacks. Tonsillectomized boys had an attack rate of 65.3 per cent., and 8.7 per cent. had two attacks, whilst for the non-tonsillectomized the rates were 59.1 per cent. and 6.5 per cent. respectively.

With regard to (1) and (2) it may be said that these results strongly suggest that tonsillectomy has no influence on nasopharyngeal infection. Here a fallacy which has already been mentioned must be emphasized. The tonsillectomized group probably includes more of the delicate and ailing children who in the past did not get on and were always ill. The non-tonsillectomized series, on the other hand, probably includes a larger proportion of boys who never ail anything—that is, boys with high natural resistance. In Cunningham's words: "Higher percentages of children often ill have tonsils removed than children less often ill." On the other hand, wealthy families with a high standard of living include the highest percentages of tonsillectomized children, so that if good economic status of the family and careful nurture are advantages the tonsillectomized group have probably enjoyed them. It might be argued that an operation which in an epidemic has brought the tonsillectomized group, with its more delicate constituents, practically to a level with the non-tonsillectomized group had, in fact, justified itself. This argument, however, appears to us to be weakened when so large a proportion of a school population is tonsillectomized. Thus, though one might conceive that when 5 per cent. were tonsillectomized this section would include most of the weaklings, yet when more than half the school is tonsillectomized it is obvious that no real selection can have taken place, and that one is almost as likely to find the strong and healthy in the tonsillectomized group as in the other.

TONSILLITIS

3. The question with regard to tonsillitis was also specially studied at three schools during epidemics of this disease. Their total boy population was 1,472, and of these 942 (62.8 per cent.) were tonsillectomized.

TABLE III.—*Epidemic Tonsillitis at Three Boys' Boarding Schools*

Boys	Total, 1,472	Tonsillectomized, 924		Non-tonsillectomized, 548	
		No.	Attack Rate (One Term)	No.	Attack Rate (One Term)
Patients with tonsillitis ...	281	162	17.5 per cent.	119	21.7 per cent.
Patients with febrile catarrh, nasopharyngitis, etc.	154	100	10.8 ,,	54	9.9 ,,
Total patients:	435	262	28.3 ,,	173	31.6 ,,

The slight advantage (as regards tonsillitis) here shown to the tonsillectomized is discounted by the natural reluctance to use the diagnosis "tonsillitis" for a patient without tonsils. Griffith and Glover[17] have recently shown that cases of nasopharyngitis, febrile catarrh, etc., occurring during epidemics of tonsillitis are often shown in bed plans of dormitories to occur side by side with cases of tonsillitis, and are, in fact, often one of the clinical manifestations of the same haemolytic streptococcal infection as tonsillitis. Whilst the tonsillectomized boys enjoyed a slight superiority (17.5 per cent. to 21.7 per cent.) over the untonsillectomized in tonsillitis, in the feverish catarrh and nasopharyngitis cases which accompanied the epidemics of tonsillitis the position was reversed, their attack rate being 10.8 per cent., compared with 9.9 per cent. of the untonsillectomized. The percentage of tonsillectomized boys who remained well during these epidemic terms in the three schools was 67.1, and of the untonsillectomized 64.6. None of these slight differences was significant. It does not, of course, follow that incidence during such tonsillitis epidemics gives any indication of the incidence of recurrent sore throat in the individual. We find no evidence that a high percentage of tonsillectomy in a school community tends to increase its herd immunity, but our experience does not include diphtheria.

MEASLES AND OTHER CONDITIONS

4. The incidence in measles was studied in three epidemics in three boys' schools. The total population was 1,469, and there were 369 boys (25 per cent.) not protected by previous attack. These susceptibles were made up of 251 tonsillectomized and 118 non-tonsillectomized boys. The attack rate upon the tonsillectomized susceptibles was 78.1 per cent., and on the non-tonsillectomized susceptibles 71.2 per cent. Owing to the large proportion (75 to 80 per cent.) of immunes at a public school, infection with measles is very irregular, and it is almost certain that the above difference has no significance; but at any rate there appears to be no protection afforded by tonsillectomy either from measles or, as we see in the next paragraph, from its common complications, otitis, mastoid disease, and pneumonia.

5. The cases of scarlet fever, rheumatism, otitis, pneumonia, and appendicitis which have occurred in seven terms (or two and one-third years) in the school population under review

have fortunately been very small, cases of scarlet fever, for example, in girls, being only twelve, and those of rheumatism in girls being only eighteen. These small numbers of cases render the girls' experience of little value except as regards appendicitis. The boys' experience is, however, sufficient to be of value, and is shown in Diagram 2 and Table IV.

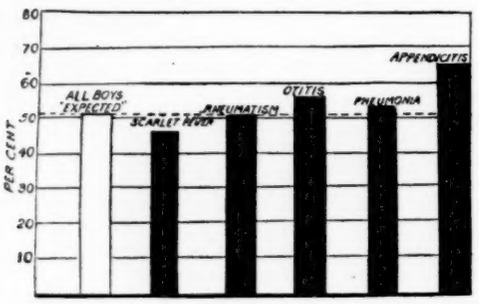

DIAGRAM 2.—Boys—all schools. (Population about 10,500, about 9,500 being boarders.) The percentages of tonsillectomized boys amongst all boys, and boys with certain diseases, showing excess or defect above "expected" (that is, all boys).

TABLE IV

Disease	Boarding Schools Only. Population, 8,263			All Schools.* Population, 10,219		
	Number of Cases	Tonsillectomized		Number of Cases	Tonsillectomized	
		No.	Per cent.		No.	Per cent.
All boys—"Expected"	—	—	53.6	"Expected"		51.8
Scarlet fever...	99	49	49.5	130	60	46.2
Rheumatism...	75	43	57.3	116	60	51.7
Otitis	229	130	56.8	268	152	56.7
Mastoid disease	37	22	59.5	40	25	62.5
Pneumonia ...	129	77	59.7	151	82	54.3
Appendicitis...	141	93	66.0	159	107	67.3

The percentages of tonsillectomized boys amongst all boys (= "expected") and amongst those boys who contracted certain diseases during a period of seven terms (2⅓ years, 1930–2), showing excess or defect above "expected" (that is, if infection were equally distributed upon tonsillectomized and non-tonsillectomized boys).

The girls suffered nearly twice as much in proportion from appendicitis as the boys, and had 80 cases—sufficient to make the experience worth recording. Of these 80 patients, 38 (47.5 per cent.) were tonsillectomized, compared with an "expected" percentage of all girls of 45.8.

Summarizing all these school observations, our opinion is that statistically they give little support to the view that tonsillectomy influences the incidence of infection either favourably or unfavourably. The slightly diminished incidence in scarlet fever in tonsillectomized boys and in epidemic tonsillitis may possibly be consistent with some increase in Dick immunity (to which we shall refer later). In otitis and mastoid disease our records are consistent with those of Paton,[12] who says: "The removal of adenoids results in an increased incidence of otorrhoea"; and those of Bradley,[24] who states: "There is ample evidence that tonsillectomy has not protected against otitis media."

Information from other Sources

SORE THROATS AND COLDS

Let us compare our school experience with that of other observers, first as regards tonsillitis. Perhaps owing to their dealing with younger children, the results obtained by Kaiser,[15] the Committee of the Board of Education,[5] Selkirk and Mitchell,[18] and Munroe and Volk[19] were more favourable to the tonsillectomized than ours. Wilson, Lingg, and Croxford,[20] in 413 children, of whom 247 were tonsillectomized, found that of the latter 40 per cent. still had recurrent sore throats, compared with 48 per cent. of the non-tonsillectomized. Most of us will, however, agree that in appropriate cases the end-results of tonsillectomy undertaken for repeated attacks of tonsillitis render the operation justifiable. To define the "appropriate case" is, of course, the difficulty; definite evidence of gross obstruction or unmistakable sepsis, or a clear history of more than three recurrent attacks of tonsillitis, or a definite tonsillar abscess, may be sufficient indication. Tonsillar abscess is rare in childhood, and, indeed, only occurs at all ages once in fifty cases of tonsillitis, or, in ages above 10, once in every twenty-three cases (Close[21]).

With regard to frequent colds, Kaiser found that tonsillectomy offers no sure protection against colds in the head, but effects some reduction in their incidence, especially in the earlier school years. Smiley,[22] dealing with students of Yale University, said that the removal of nasal obstructions and diseased tonsils in more than half of those having four or more colds in a year did not result in a reduction, whilst Forsythe,[23] in 537 students of the University of Michigan, found that the tonsillectomized had 40 per cent. more acute respiratory infections than the non-tonsillectomized. In this country Bradley[24] has found that nasopharyngitis occurs irrespective of the presence or absence of the tonsil, and that the operation is of no appreciable value in the prevention of epidemic nasopharyngeal infections.

PULMONARY INFECTIONS AND OTITIS

In respect of chest infections in children, opinion has apparently changed in the last ten years. Coakley and Pratt[25] believed that complete tonsillectomy markedly reduced the incidence of respiratory infections. Kaiser, however, found that the figures for bronchitis during both his three-year and ten-year periods were twice as bad for the tonsillectomized children as for the non-tonsillectomized children; his figures for pneumonia were also definitely worse. These results seem significant, for his control children had exhibited equal indications for tonsillectomy as his tonsillectomized children before operation, thus eliminating any error due to the fact that the child who is often ill (particularly with respiratory infections) is more likely to be operated on. In both pneumonia and pleurisy, in Cunningham's figures, the tonsillectomized students have a slightly higher incidence than either the normal or the "pathologic" series.

As to otitis media, Kaiser thought this occurred somewhat less frequently in the children operated on, but Cunningham, like Paton and Bradley, considers that tonsillectomy is not an effective means of prophylaxis against otitis media.

TONSILLECTOMY AND RHEUMATIC CONDITIONS

The literature of the end-results of tonsillectomy with regard to acute rheumatism, chorea, and rheumatic carditis is so extensive that the briefest summary must suffice. There are several distinct questions:

1. Does tonsillectomy *before* rheumatic infection diminish the liability to primary rheumatic infection?

2. *After* the rheumatic infection has occurred, does it tend to prevent further attacks or recurrences?

3. Does it diminish the severity of attacks?

4. After infection, does it tend to reduce the liability to carditis?

5. Should it be done as a routine measure in any case where the diagnosis of rheumatic infection is established?

All have been answered differently by different observers. With regard to the first, Kaiser thought the tonsillectomized child not yet infected has a decidedly better chance to escape rheumatic infection over the same period of time than the child whose tonsils have not yet been removed. Campbell and Warner,[26] however, working with 1,010 children, found that complete enucleation of the tonsils is without effect in preventing the onset of rheumatism, the proportion of children who subsequently

* "All schools" consist of the boarding schools in the left-hand column, together with two large naval boarding schools and one large public day school.

developed rheumatism being the same as if the tonsils had not been enucleated. On the other hand, children with incomplete tonsillectomy before the onset of rheumatism show a much greater tendency (more than twice as great) to develop it, and they found that in 25 per cent. of the tonsillectomized the operation was incomplete.

As regards the second question, Kaiser found recurrences as frequently in the tonsillectomized rheumatic children as in those in whom the operation had not been performed, and is thus in agreement with Campbell and Warner, Vining, and many others. Those with the greatest clinical opportunities seem almost equally divided on this question of recurrences, and on the closely linked and even more vital question as to the prevention of carditis. In the time at our disposal it can only be said that no sufficient case has been made out for the removal of apparently healthy tonsils in a rheumatic or potentially rheumatic child simply as a measure of prophylaxis against acute rheumatism, and that the operation does not appear to have any great influence on the behaviour of rheumatism or on the occurrence of carditis or chorea. If, however, the tonsils are obviously diseased, they should be removed when possible, but not during or soon after an attack of rheumatism. By the recent brilliant work of Collis,[28] Sheldon,[29] and Schlesinger[30] in this country, and of Coburn[31] in America, recurrences of acute rheumatism in children have been shown to be almost invariably associated with a *fresh* infection of the patient's throat with haemolytic streptococci, taking the form either of a tonsillitis or of a nasopharyngitis, usually a fortnight before the occurrence. Collis[9] tells us that "tonsillectomy makes little or no difference in determining whether a child will or will not relapse if he gets a haemolytic streptococcal throat infection, but if a relapse has occurred the presence of tonsils which have become seriously infected tends to prevent the rheumatic symptoms from clearing up, and has on several occasions seemed to lead to a fatal conclusion. In such fatal cases of acute rheumatism the tonsils are often found to be extremely septic, containing an almost pure culture of haemolytic streptococci, the patients having been too gravely ill to undergo tonsillectomy." Few will doubt the importance of ridding the rheumatic child of tonsils that are septic. It is, moreover, essential to protect the rheumatic child from reinfection from persons with sore throats or carriers of haemolytic streptococci, and here the end-results of a vicarious tonsillectomy may be excellent, of which Homer Swift[32] gives an example:

"Several years ago we learned that the mother of one of our rheumatic children frequently had sore throats within a short time of the appearance of relapses in the child. Following the removal of badly diseased tonsils in the mother her sore throat ceased, and since then the child has been free from recurrences."

Effects on Malnutrition and Diphtheria Immunity

The end-results of tonsillectomy upon *malnutrition* are as statistically baffling as those in any other condition. Paterson and Bray,[3] apart from their rheumatic group, recorded alimentary and wasting indications in 174 (35 per cent.) of their 500 cases, and showed excellent results in continuous gain in weight and clearing up of constitutional symptoms in nearly all. Their rheumatic group gained proportionally the most weight. Vining,[27] however, found his "no operation" group had an average greater gain of weight than his "operation" group, and Kaiser, whilst recording striking individual cases of relation between malnutrition and disease of the tonsil, finds that this does not hold good when large groups are surveyed. He found that there were only a few more (about 10 per cent.), underweight children among the non-tonsillectomized than among his operated group. Cunningham, in her second paper on the tonsillar state in young women students of the University of California, found that "there is no argument in this field for removing pathologic tonsils."

As to the effect of tonsillectomy on immunity to diphtheria and the Schick reaction, which has recently been fully discussed by Dudley,[33] the opinion of observers is divided. One of the end-results of tonsillectomy certainly seems to be diminished liability to, and lessened severity of, clinical diphtheria, the only infectious disease in which this seems agreed, though some have thought the incidence and severity of scarlet fever was also lessened by it. It is possible that a slight and perhaps transitory increase of Dick immunity follows tonsillectomy due to infection of the operation site by haemolytic streptococci, an infection which not infrequently gives rise to rashes, and even true scarlet fever, after tonsillectomy. Tonsillectomy often effectively terminates the *carrier state* in chronic carriers of either diphtheria bacilli or haemolytic streptococci, though Dudley found there was no significant difference in the carrier rate for toxigenic diphtheria bacilli between tonsillectomized and other boys at Greenwich Hospital School.

Summary

1. The rising flood of tonsillectomy has been shown in the immense and rapid increase in the numbers of operations annually performed, and by the astonishing fact that more than half the most carefully nurtured children in this country are now subjected to it, whereas forty years ago none of their parents underwent the operation. Whilst the incidence of tonsillitis is at least as high amongst the poor as amongst the well-to-do, the children of the latter have an incidence of tonsillectomy at least four times as high.

2. A review of the literature suggests that, with the single exception of diphtheria, the incidence of the ordinary infectious diseases is unaffected by tonsillectomy; that while the incidence of recurrent sore throats is perhaps somewhat diminished, that of frequent colds is unaltered, or perhaps slightly increased. The incidence of otitis and mastoid disease is the same, or perhaps slightly increased upon the tonsillectomized, while their liability to bronchitis and pneumonia is also probably slightly increased.

3. The evidence with regard to the prophylactic and therapeutic end-results of tonsillectomy on acute rheumatism, chorea, and carditis is distressingly confusing. There is no sufficient case for the routine removal of apparently healthy tonsils in a rheumatic or potentially rheumatic child, simply as a measure of prophylaxis against acute rheumatism. Removal should only be undertaken if there is some definite indication.

4. Observations have been detailed on the relative incidence of nasopharyngeal infections upon the tonsillectomized and the non-tonsillectomized pupils of a school population numbering nearly 14,000. Most of these pupils were between the ages of 13½ and 18, and belonged to the well-to-do classes. Save for two, with a total of 1,100 pupils, all the schools were boarding schools. Rather more than half of this population was tonsillectomized. Some of the observations cover a period of seven terms, or two and one-third years, whilst others are confined to certain terms of epidemic prevalence.

5. These interim observations (so far as they have gone) give no statistical support to the theory that the removal of tonsils closes an entrance for infectious or respiratory diseases. Hardly any cases of diphtheria have occurred, so that the prophylactic value of the operation in this disease could not be assessed. In scarlet fever, otitis media, and mastoid disease no significant differences were observed. In the two latter diseases the slight differences observed were in favour of the non-tonsillectomized.

6. These observations, based on actual *attack rates* in a school population, generally support the conclusions arrived at by Cunningham from a study of the *histories* of a similar number of somewhat older students. She found that the tonsillectomized pupils gave a history of higher incidence of all illnesses, and suggests that the fact that children who are often ill are those most frequently tonsillectomized may be the explanation. Comparing the proportion of the amount of illness reported

before and after tonsillectomy in the same pupils, she suggests that the removal of tonsils had little influence in lessening the susceptibility to most infections.

7. We hold no brief for the retention of diseased or really obstructive tonsils or adenoids, nor do we wish to cast doubt upon the high value of the operation in cases in which there is sure evidence of toxic or obstructive damage. A review of the literature and the epidemiological observations made on a highly tonsillectomized child population suggest, however, that the excellent end-results of tonsillectomy in selected cases have been statistically overweighted by indifferent end-results in cases in which the operation has been performed without sufficient indications as a more or less routine prophylactic ritual. In our opinion, a large proportion of the tonsillectomies now done in children are unnecessary, entail some risk, and give little or no return.

In conclusion, we wish to thank the Medical Research Council and the Committee of Investigation into Epidemics in Schools for their kind permission to use their records for our observations, and Dr. E. A. Straker for much help.

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THE MENACE OF QUACKERY TO PHYSICAL MEDICINE *

BY

C. B. HEALD, C.B.E., M.D., M.R.C.P.,

PHYSICIAN, PHYSICAL MEDICINE DEPARTMENT, ROYAL FREE HOSPITAL AND BRITISH RED CROSS CLINIC; CONSULTING PHYSICIAN, ROYAL AIR FORCE

Cassell's Dictionary defines a quack as: "a boastful pretender to skill which he does not possess, especially medical skill," and shows that the word is derived from the cry of a duck. Since quackery in physical medicine is associated chiefly with claims for effects produced by apparatus rather than for the skill of the person using the apparatus, the definition needs some modification for the purpose of this discussion. A suitable definition would be: "One who boastfully pretends that apparatus has therapeutical effects which he knows it has not, or who is too ignorant or credulous to discover that it has not."

With this definition as a working basis it is clear that two types of quack must be recognized: the purposeful or "charlatan" quack and the "ignoramus" quack. Only an insignificant part, however, of the menace of quackery in physical medicine comes from the out-and-out charlatan quack, whether qualified or unqualified. The charlatan turns to physical and especially to electrical apparatus, because even to-day the general public understands very little about electrical currents, and he is therefore in a position to "put over" statements about the action and effect of his apparatus that are unlikely to be controverted. Moreover, apparatus with switches, wires, lights, or crackles suggests *per se* that something tangible is going to be done, and has in consequence a strong element of initial suggestion. Further, the apparatus provides an excellent excuse for repeated visits and the consequent repetition of fees.

* Read in opening a discussion in the Section of Physical Medicine at the Centenary Meeting of the British Medical Association, London, 1932.

THE "IGNORAMUS QUACK"

The different types of ignoramus quackery can best be considered under the heads of: (1) The medically unqualified practitioner. (2) The manufacturer. (3) The medically qualified practitioner. Each of these classes presents a different kind of menace to the welfare of physical medicine.

1. *The Unqualified.*—I have placed the unqualified practitioner first, not because he constitutes the greatest menace, but because he constitutes the smallest and can be dismissed from our discussion in a few words. The unqualified practitioner is debarred by law from describing himself as a doctor of medicine, and has other legal disabilities and difficulties. Thus the great majority of those attending him are well aware that he is not a duly qualified medical man, and they seek his advice or treatment with their eyes open. He must therefore derive the majority of his clientele from the ranks of the superstitious, the over-credulous, or those who go as a last resource and a forlorn hope. With the increase of the interest and education of the public in electricity and physics—largely brought about by wireless—he is more easily seen through, and as the field of successful treatment by qualified men grows ever wider, the group of patients who fail to find relief along orthodox lines diminishes, and thus the quack's sources of supply steadily decrease. It can be laid down as a safe axiom that when medical diagnosis becomes accurate quackery walks out of the door. By accurate diagnosis I mean not only the correct naming of the disease, but a true understanding of the cause, as then the treat-

ment consequent upon the medical diagnosis will become effective. The diagnosis of diphtheria is absolute and its treatment universally accepted ; the diagnosis of influenza is not yet clear, and methods of treatment are, in consequence, legion.

2. *The manufacturer,* before making or approving the advertisement of any apparatus, has a duty to the profession and to the public to satisfy himself that what he is putting forward conforms to certain criteria:

(*a*) Is the apparatus a genuine piece of physical apparatus properly assembled and capable of actually delivering the current or making the ray he claims for it?

(*b*) Is he prepared to submit the apparatus without obligation of any kind to the Physical Treatment Department of some well-recognized hospital for unhurried investigation of its clinical effects and physical efficiency?

(*c*) Is he prepared, in the event of the report proving definitely disadvantageous to any claims for the therapeutic value of the apparatus, to withdraw such apparatus or such claims until fuller investigation or alteration of the apparatus makes claims and clinical effects reasonably consistent?

(*d*) Will he also agree not to advertise or to sell to the public apparatus for treatment without a prescription from the medical attendant?

If he will do these things he will deliver a death blow to quack physical apparatus ; and, had this been the universal custom of manufacturers, we should have avoided many of the ridiculous statements and claims that have received undesirable publicity and brought discredit upon our specialty.

The removal of quackery in the manufacturing line can be achieved most simply and effectively if the manufacturers will get together, raise sufficient funds among themselves or from the public, and come forward with these funds and ask the British Medical Association to set up a standing independent committee of investigation to which they could refer existing or experimental pieces of apparatus for test, both clinical and physical. I feel sure such a committee would practically rid physical medicine of inefficient quack apparatus, as only apparatus certificated by the committee would be employed by the great majority of practitioners.

3. *The Qualified.*—Among the qualified are quacks of two kinds: those who use electrical or physical apparatus themselves, and those who know nothing about physical therapy apparatus but send their patients on to technicians for such treatment.

The medical practitioner who employs electrical or physical apparatus can, by applying a short series of test questions to himself, find out quite clearly whether he is in part or wholly a quack:

(*a*) Has he, as far as clinical and theoretical study can carry him, acquired an understanding of the physical nature and physiological effects of the apparatus he is employing?

(*b*) Is he truthful in his statements about the probable effects of the currents he employs, and does he avoid overstatement of their benefits and underestimation of the failures?

(*c*) Does he only apply a current or a ray, or order a bath, after a thorough general medical examination of his patient?

(*d*) Does he select from the patients consulting him only those suitable for treatment?

(*e*) Does he avoid using one single apparatus for every type of patient?

(*f*) Does he give part of his time voluntarily to a hospital or clinic where he can keep in touch with all branches of modern medicine?

If he can answer these questions in the affirmative he is helping the subject forward. If he cannot, he is providing justification for those who hold the opinion that "all physical medicine is merely a kind of quackery." Let these questions, then, be the test to distinguish between desirable and undesirable recruits for our subject.

On reading them through and remembering past experiences, I am inclined to add this further question: Is he prepared, if sponsoring a new apparatus, to submit it to impartial test? Because he must remember that physical medicine is still largely in the experimental stage and therefore liable to be regarded askance unless each new advance is brought before the profession with the most careful scientific safeguards, evidence, and procedure. The practitioner who employs the Abrams box, for instance, would find it very difficult to answer the test questions in the affirmative with a clear conscience.

In a recent publication eulogizing this method of treatment, the two authors state that "Dr. Heald also acted as subject, and he also could feel the reactions." They omit to mention that these observations were not made with the Abrams box at all. They also state that the Horder Committee has not yet investigated the pathological reactions of cancer, tubercle, syphilis, etc. Since this kind of statement continues to be repeated, it is time to say what actually took place. A selected number of specimens from a prearranged group of diseases, including the majority of those enumerated, were submitted for test to a number of exponents of the Abrams box. Its exponents were nominated by themselves ; the method of taking the specimens was carried out by independent observers who conformed exactly to the requirements enumerated for the collection of the best material. In short, there was no particular asked for by the supporters of the Abrams box that was not granted. The only request the Horder Committee made was that the results should be available for publication, whatever they were.

The results were submitted to an independent statistician, who reported that there was absolutely no evidence of any agreement in the diagnoses made. The table setting out this laughable position was actually in galley proof when the exponents of the box demanded its deletion. The committee took the view—and I think quite rightly—that if we insisted on our right of publication we should only open a chapter of undesirable inter-medical bickering. It is clear, I think, from the quotations I have given that the risk we took of not being misrepresented was too great.

In my considered opinion it is among members of the medical profession who never touch or use any electrical or physical treatment apparatus—the second kind of qualified quack—that the worst form of quackery is found and constitutes the greatest menace to the subject. The medical practitioner who sends patients to non-medical technicians for treatment by electrical or other physical apparatus must be able, if he does not wish to be in effect a quack of the ignoramus class, to answer the following questions in the affirmative:

(*a*) Has he taken care to ascertain by examination that his patient is likely to benefit by physical treatment?

(*b*) Has he made his prescription for the type of physical treatment he desires so precise in all essential details that a physical treatment technician can give a useful standardized treatment?

(*c*) Does he, when his patient is in the hands of the physical treatment technician, keep regular clinical control of the results of the treatment?

(*d*) Does he, if he cannot prescribe details of technique accurately, make sure that his patient is seen by someone capable of so prescribing?

If he does these things, then he is truly informed of the modern advances of medicine, and if he does not, I suggest that he is in reality a quack, and constitutes one of the real menaces of quackery in relation to physical medicine.

An authority with wide experience of the difficulties of physical medicine technicians, particularly in relation to their undertaking not to treat patients except on the prescription and under the control of a medical practitioner, puts their point of view as follows:

"The great grouse which the recognized physical medicine technician has, is the manner in which he is allowed to continue treatment prescribed by a responsible medical practitioner without that supervision and control of the treatment which the medical practitioner ought to exercise from time to time. What I mean is this. A medical practitioner advises a particular course of treatment at the hands of a physical medicine technician. This treatment may last a considerable time, and during the application of the treatment certain circumstances may arise which, in the opinion of the technician, warrant a discontinuance of the treatment or a modification of it. In these instances is the practitioner who ordered the particular form of treatment always disposed to listen to the observations of the technician in the same way in which a physician is disposed to listen to the observations of a nurse who is looking after a patient? I constantly hear from people who are undergoing a particular form of physical medicine treatment that they are left too long in the hands of the technician without a reference back to the practitioner in charge of the case. I appreciate, of course, that this may be due to insufficient knowledge on the part of the practitioner who ordered the treatment, but occasionally it happens that it is due to the fact that, having once ordered the particular line of treatment, the physical medicine expert himself does not exercise that measure of supervision which he ought to do."

THE TEACHING OF PHYSICAL TREATMENT

I admit that the practitioner may fairly reply to some of these questions, "How can I do these things? I have never been given the opportunity to familiarize myself with the prescribing of physical treatments." This must be remedied, because it will at once be admitted by every thinking medical man that physical measures now take an essential and prominent part in his armamentarium of diagnosis and treatment. To take as examples only *x* rays, radium, and endothermy, the first has become of universal value and the second and third are the adopted children of all surgeons; yet all the original work that has made this possible has come from the small band of workers in physical medicine.

The reason why the ranks of practical workers in physical medicine inevitably contain a small number of quacks is undoubtedly because the professional attractions of this specialty are not sufficient to secure a flow of first-class recruits. If physical medicine is to thrive and take its place as an honoured branch of medicine, as the British Medical Association firmly intends it shall, the time has come entirely to alter its position in relation to medicine and surgery. The medical man on qualifying, or finishing a house appointment, sees before him certain well-defined lines along which he may advance. He knows that if he turns to general medicine and is successful he will pass through the grades of medical registrar, assistant physician in charge of a few beds with opportunities for teaching, and finally to full physician with beds and all their opportunities for original work. There is a very similar route if he turns to surgery or to the specialties of gynaecology, laryngology, ophthalmology, orthopaedics, and dermatology. If, however, he considers physical medicine as a career he sees that the majority of those specializing in this subject have not the same status in their hospital as the practitioner of even the least of the specialties mentioned. He realizes that they have no beds or prospect of beds, and that only in rare instances have they that great stimulus to good work—the opportunity of teaching students. If he is really inquisitive as to his future he will discover that in a number of hospitals the medical man in charge of the physical therapy department is not even a member of the medical staff. If he has been on the house staff he will know that the usual practice is that the physical medicine department may not have cases referred to it directly, and that it is largely used as the dumping ground for the hopeless chronics. Is it then any wonder that this subject does not draw an adequate flow of good new recruits?

These drawbacks and disadvantages are easily remediable by those who rule medicine, and indeed in some places they are already being removed. I am proud to say that the hospital to which I belong has removed most of them, and will undoubtedly remove the remainder as opportunity offers. But elsewhere there is much to be done, and I consider that the advancements in treatment by means of physical measures are so great and so frequently used that it is the duty of those in authority to free the subject from hampering and vexatious disabilities.

Remembering how valuable certain physical measures now are in orthopaedics, venereal disease, gynaecology, and dermatology, as well as in general medicine and surgery, one is forced to ask: "Has not the time come when our specialty should be fitted into existing medicine rather than remain an isolated subject?" The medical curriculum is already so heavily loaded that to add to it any further periods of training is obviously unwise. The number of post-graduate diplomas is also already more than sufficient for any single profession.

A SUGGESTED SOLUTION

My suggestion for the solution of this problem is the centralization in one department of all physical measures in a hospital. Physical medicine is found at present scattered through all branches of hospital service, both surgical and medical. Light treatment is perhaps given in the skin department, massage in the orthopaedic department, and electrical treatment somewhere else. If all the physical treatment apparatus were grouped in one department the resulting centralization of effort and methods would be of benefit to the patient and of great educational value to the student. Moreover, if the heads of this department were recognized as likely candidates for appointments to the surgical and medical staff, there would be no difficulty in securing medical supervision.

It is common enough for one physician on a staff to have a bias to cardiology—using a delicate and complicated electrical apparatus—and another to have a leaning towards biochemistry, while one of the surgeons specializes in orthopaedics and another perhaps in cystoscopy. There is no reason why one physician and one surgeon out of the staff of every hospital should not make a specialty of physical medicine. These members would have reached their position on the staff via the post of assistant physician or of assistant surgeon in charge of the physical therapy department, instead of assistant physician or assistant surgeon in charge of out-patients, and would retain throughout their full staff appointment their interest in physical technique as applied to medicine or surgery as the case might be. I recognize that these proposals are somewhat revolutionary and only capable of gradual development, but I put it to this meeting that by their adoption the problem of beds, of status, of teaching, and of the avoidance of any additional load to the curriculum would be satisfactorily solved. At the same time they would ensure that the oncoming generation of practitioners would learn, in the ordinary routine of hospital work, the general lines of physical medicine, technique, and prescribing. Then physical measures would constitute as integral a part of the practitioner's knowledge as the technique of asepsis.

In conclusion, it would in my opinion be a great day for physical medicine, not only in this country but also in America and on the Continent, if we could agree, as a result of this discussion:

1. That the test questions lay down a sound ethical standard for practitioners of physical medicine, practitioners utilizing physical apparatus, and manufacturers.

2. That the best interests of physical medicine in the future lie in a closer and more practical link with general medicine and surgery.

3. That the establishment of a committee for investigating claims for apparatus would largely stop the flood of quack appliances.

A CASE OF HOOKWORM DISEASE

BY

W. M. FALLON, M.D., B.Sc., D.P.H.

LECTURER IN CLINICAL MEDICINE, UNIVERSITY COLLEGE, GALWAY

The following case of ankylostomiasis furnishes several interesting points.

CASE RECORD

In September, 1929, a missionary, aged 40, visiting me with a patient, mentioned casually that he himself was suffering from malaria, and asked me what dose of quinine would I recommend for the attacks. I said 10 grains three times a day, to be reduced after three or four days to 10 grains at night, etc. A year later the missionary again presented himself, complaining that he was suffering from malaria and that quinine did not relieve him. He looked sallow and melancholy ; complained of irritability, headaches, inability to concentrate, mental torpor, insomnia, lack of energy, and a slight pain over splenic area. He also complained of slight shivers and a feeling of fever coming on irregularly. A few days previously he had played hurling to make himself perspire, and on the following day he felt very ill. He said his feet and face were then swollen, and he stayed in bed for two days before coming to see me.

Examination

On examination the swelling of feet and face was not evident ; the abdomen was soft and pultaceous, and a little diffuse soreness on palpation was present. The spleen was not enlarged. The cardiac first sound was rather sharp. The sclerotics had a faint yellowish tinge. His temperature was normal. As he had a feeling of feverishness, headache, and shivers the previous evening, I asked for a blood examination, feeling that, in such circumstances, a negative report, combined with a normal spleen, would point to some condition other than malaria. Examination by Professor T. Walsh revealed absence of malarial parasites in fresh and stained films and the following figures: red blood corpuscles, 4,438,000 ; haemoglobin, 85 per cent. ; colour index, 0.95 ; leucocytes, 26,600 ; eosinophils, 75 per cent. ; lymphocytes, 15 per cent. ; polymorphs, 10 per cent.

A specimen of the stools examined later showed the presence of the ova of ankylostoma in large numbers. To avoid the possibility of error in reference to the eosinophil figure another blood examination was made the next day, and the figures were substantially confirmed.

Previous History

The patient's past history was as follows. He arrived in Nigeria in November, 1923, and enjoyed fair health until early in 1925, when he began to suffer from what he thought was slight malaria. His symptoms were: a feeling of heat, though he could not perspire, slight pains in the abdomen, lack of appetite, slight shivers occurring irregularly, irritability, and depression. He gradually got worse, and at the end of six months had lost 28 lb. in weight. He improved somewhat until at the end of 1926 he went to live at Aginebode, on the banks of the Niger. He now noticed that his abdomen was sore, food felt heavy and sour, and his faeces were blackish. A long walk would produce swelling of his feet, his appetite became very poor, and he became thin, suffered from insomnia, depression, headaches, inability to concentrate, buzzing in the head, and repeated syncopes. Occasional rest enabled him to carry on. About June, 1927, he got what he felt was an attack of asthma, which lasted three weeks. There was no history of dermatitis or "ground itch." He left for home in May, 1928. When he arrived home he recovered his appetite slowly, but the feverish feeling still persisted, and with it depression and sleeplessness.

Treatment and Progress

Instead of supper, 1 oz. of mist. alb. was given. In the morning 15 grains of powdered thymol in capsules were given every hour for three doses, and two hours after the last dose 1 oz. of mist. alb. was administered. Three days later, October 4th, 1930, a blood count showed: red blood corpuscles, 4,640,000 ; haemoglobin, 90 per cent. ; colour index, 0.97 ; leucocytes, 15,240 ; eosinophils, 55 per cent. ; lymphocytes, 16 per cent. ; polymorphs, 25 per cent. ; monocytes, 3 per cent. ; basophils, 1 per cent.

On October 7th ankylostoma eggs were seen in small numbers in the stools. On October 8th the thymol treatment was repeated. On October 9th 0.5 c.cm. of oil of chenopodium was administered every hour for three doses, 1 oz. of mist. alb. being given two hours after the last dose. On November 6th the patient returned for re-examination. No ova were found in the stools, but the blood count was practically the same as that of October 4th, giving a white cell count of 50 per cent. eosinophils. On February 4th, 1931, the patient's blood was normal, showing only 1 to 2 per cent. of eosinophils, and all symptoms had disappeared and have not returned up to the present date.

DISCUSSION

This case presents evidence that the hookworm can live for at least twenty-eight months, as the patient left Africa in May, 1928, and the ova were recognized in September, 1930. The possibility of reinfection at home may be eliminated, although the disease is not unknown in these islands (Cornwell bunches, etc.).

It also illustrates a very marked degree of eosinophilia. This is supposed to connote a high degree of resistance, and certainly the patient's condition was good considering the abundance of eggs and abnormal blood picture. It tends to confirm the opinion that a specific poison is elaborated in this disease. Headaches, melancholy, and inability to concentrate suggest a specific poison attacking brain and liver (the chief seat of eosinophil formation). The presence of these symptoms in the ordinary case of hookworm disease may be attributed to the usual resultant secondary anaemia, but its absence in this case and the absence of any other gross physical signs suggest that these symptoms resulted from the action of a specific poison, more especially as these symptoms disappeared on treatment.

The significance of eosinophilia is not yet understood. It may be associated with endocrine disturbance. In rapidly fatal cases of hookworm disease the eosinophilia diminishes. In hydatid disease eosinophilia disappears if suppuration of the cyst occurs. Petersen and Saelhof found that eosinophilia occurred in irradiated dogs only if the liver had been included in the irradiated area. In hookworm disease the tissue at the sites of the bites of the worm in the intestines is packed with eosinophils. The absolute and relative diminution in polymorphonuclear leucocytes and the absolute increase in lymphocytes may be noted in the blood picture of this case.

The absence of anaemia is a striking feature when we remember that the disease is called tunnel workers' anaemia, tropical chlorosis, Egyptian chlorosis, and that Whipple has demonstrated a haemolytic poison in the parasite.

Although the parasites were killed and eggs absent from intestines, evidently the poison still remained for quite a long period in the system, as we see no great change in the blood count after a month.

The blood picture, the persistence of the infection, and the reaction to treatment are points of clinical interest in the case to which I feel attention may profitably be drawn.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

RAW MILK AND DENTAL CARIES

A COMPARISON OF THE TEETH AND DIETS OF TWO ISOLATED ISLAND COMMUNITIES

The prominence recently accorded to the dental perfection of the islanders at Tristan da Cunha prompts a comparison in this respect with the members of another isolated community—namely, the islanders at Pitcairn—who, in curious contrast, have notoriously bad teeth.

Concerning the Pitcairn Islanders, Rosalind Young, herself a native of the island, in the *Story of Pitcairn Island* (1894), referred to "the loss of the front teeth, which is quite general." Staff-Surgeon Lobb (Admiralty Report, 1907) said: "The incisors are mostly attacked, those of the upper jaw more than those of the lower . . . . giving to many of even the young women a 'toothless hag' appearance. The other teeth may or may not be decayed or absent. In many examined the remaining teeth were perfectly sound; in others practically all the teeth were decayed or absent." Staff-Surgeon Lindop (Admiralty Report, 1911), after a brief visit, wrote: "I noticed the upper incisor teeth of many of the boat's crew were missing, and found the same thing in several cases of the women on shore. . . . The molars are decayed in some instances, but on the whole compare very favourably with bluejacket teeth."

DIET OF THE ISLANDERS

These two communities (of Pitcairn and Tristan da Cunha) exhibit many points of similarity. Both are descendants mainly of British males and native females, both depend on visiting ships for flour, etc., as cereals are not cultivated by either; fish and eggs form a large proportion of their diet, flesh foods are eaten comparatively sparingly, and deaths are reported as usually occurring from accident or old age. But while Tristan depends largely on potatoes and grows apples, Pitcairn produces the very similar yam and sweet potato and a large variety of fruits, and also produces sugar cane, "syrup made from its juice being used instead of sugar." There would appear, however, to be a sharp difference in the consumption of fresh milk. In Tristan in 1904 there were about 500 head of cattle. According to Mrs. Rose Rogers, who lived there from 1922 to 1925, when children are being weaned the custom is to give them milk warm direct from the cow, as milk is never heated and hardly ever diluted for them; moreover, it remains one of their staple foods throughout their lives. In Pitcairn, on the contrary, there were from 1859 to 1894 no cattle, and so far as I can ascertain there have been none since, as the island is considered too small to allow of their increase. It possesses many goats, but these are mainly referred to as being wild and hunted, and so not available for dairy purposes.

DENTAL CONDITIONS ON PITCAIRN

In the *Story of Pitcairn Island* there is no reference to the use of milk there during the whole if its history. Curiously enough, the Admiralty report (1911) made on my behalf by the courtesy of Sir James Porter, the then Director-General of the Naval Medical Service, and regarding certain dental characteristics at Pitcairn, stated that tinned milk was one of their luxuries. Apparently the only raw milk used at Pitcairn is mother's milk. It is of interest to note that the incisor teeth are among those that might particularly be expected to be detrimentally influenced by the absence of milk from the diet in early life—as they are largely developed and calcified during the first six years—and that even the mandibular incisors are attacked, which is rarely the case in England, as their non-retentive shape is looked on as being specially protective, whatever other errors in development, formation, or diet may be present.

Both Admiralty reports agree that the teeth developed later and erupted when the child is old enough to exercise some choice in its foods are freer from caries than the earlier-developed permanent teeth, which, in view of findings recently expressed with regard to the possible effects of raw milk on dental formation and resistance, is what one would expect in the circumstances.

Again by the courtesy of the naval medical authorities a further inquiry is now being made relative to the details of child nurture, and the absence, in more recent years, of a fresh milk supply at Pitcairn.

Of great interest in this connexion would be a report on the state of the first permanent molars, which one would expect to show a high incidence of caries; indeed, the fact that they "compare very favourably with bluejacket teeth" indicates almost that this is the case.

EVELYN SPRAWSON, M.R.C.S., L.D.S.
London Hospital Dental School.

A CASE OF ACUTE OSTEOMYELITIS OF A DORSAL TRANSVERSE PROCESS

The following case seems worthy of record on account of the rarity of the condition and the difficulty of diagnosis in the early stages.

CASE RECORD

Henry G., a farm labourer, previously in good health apart from slight dyspepsia, presented himself on March 3rd, 1932, complaining of pain in the back, "under the right shoulder." Muscular rheumatism was provisionally diagnosed, and treatment prescribed. Two days later there was fairly severe pain of a continuous nature between the right scapula and the spinous processes. There was some old-standing bronchitis, but no lesion could be found to account for the pain. Sedatives were given. The pain increased in severity, remaining in the same situation, and on March 13th he was seriously ill, groaning with pain, his temperature being 101°, and his pulse rate 120. Respiration was not painful, and there was no pain on percussion or springing of the ribs, nor on percussion or movements of the right scapula. Percussion of the 5th, 6th, 7th, and 8th dorsal spines caused definite pain, but it was not more marked in one than another. There was some oedema between the vertebral border of the right scapula and these spines, and this area was very tender. Aortic aneurysm seemed a possibility because of the intensity of the pain, but examination excluded this. Spinal caries with miliary dissemination of tuberculosis seemed more probable, whilst pyogenic osteomyelitis of a rib or vertebra had to be considered. It was obvious that he had not a mural empyema, though an interlobar one was a possibility, largely discounted by the severe pain. *X* rays failed to furnish convincing evidence of the condition of the bones, but showed lung shadows suggestive of tubercular involvement, increasing the probability of spinal caries as the correct diagnosis. The patient was admitted to the Butterfield Hospital, Bourne, for observation. He was acutely ill, the temperature chart showing an irregular pyrexia up to 102°. Frequent doses of morphine were necessary for him to obtain any rest. It was essential that a correct diagnosis should be made between the two most probable conditions—spinal caries and pyogenic osteomyelitis—the treatment for each of these being absolutely contraindicated for the other. Three days after admission the red and tender area showed signs of fluctuation, and on introducing a wide-bore needle, thick green pus was obtained, which on culture showed a pure growth of *Staphylococcus aureus*.

Progress

On March 30th Dr. Monteith operated under ether anaesthesia, the incision lying vertically alongside the needle puncture. A narrow track of pus was found, leading down to a cavity which was bounded posteriorly by the mass of the erector spinae muscles, and anteriorly by the transverse processes with the intertransverse ligaments, and extended 4 inches vertically. When this had been opened up and cleaned out, bare bone was felt at the tip of the sixth transverse process. This was gouged out, mainly with an antrum burr, and the wound packed with 1 in 1,000 acriflavine. Next day continuous irrigation was instituted with Dakin's solu-

tion, and this was continued for two weeks, a 2 per cent. solution of chloramine-T being substituted for it after a few days. This kept the wound very clean and was much less irritant to the skin. There were occasional rises of temperature during this period, but the general condition was very greatly improved, and after six weeks he left the hospital with a small sinus. This was packed daily, two exposures of ultra-violet light being given to hasten healing, and to-day, nine weeks after the operation, the wound is completely healed, he is free from pain, and in very good health.

I am indebted to Dr. Monteith for permission to publish the details of this case.

JOHN DONOVAN, M.B., Ch.B.Leeds,
M.R.C.S., L.R.C.P.

Bourne.

PERITONITIS DUE TO B. FRIEDLANDER

The following case may be of interest.

A girl aged 9 was admitted to the Mildmay Mission Hospital, Bethnal Green, at 7 p.m. on June 25th, 1932; she was unconscious, with temperature 104° F., pulse 160, almost imperceptible, and respirations 44. There was a history of a sudden onset of abdominal pain two days previously, accompanied by diarrhoea and vomiting; this had persisted on and off. On the morning of June 25th the child had become light-headed, later drowsy, and then unconscious. On admission she vomited some bile-stained fluid. There was a past history of frequent bilious attacks.

On examination she appeared desperately ill, with drooping eyelids and an earthy complexion, unconscious of surroundings, lying with knees slightly drawn up, and plucking restlessly at the bedclothes. The skin was warm and dry, the tongue dry and furred; the throat appeared natural, but there was some nasal discharge. Breath sounds were diminished at the right base, otherwise the chest was normal. In the abdomen there was some fullness below the umbilicus; the upper part moved with respiration. There was definite rigidity in the right iliac fossa, and a little in the right upper quadrant and left iliac fossa. Pressure in the right iliac fossa roused the child and caused her to draw her legs up. Percussion yielded a resonant note above the umbilicus and a dull note below it. The vagina was reddened, but there was no discharge. A catheter specimen of urine showed a trace of albumin but no sugar.

The child was placed in full Fowler position, and at 9 p.m., under local anaesthesia, a small incision was made and a tube inserted into the peritoneal cavity. A dark offensive fluid containing flakes of lymph was found. Ten thousand units of anti-gas-gangrene serum were injected intramuscularly, and half a pint of 5 per cent. glucose in saline given intravenously. There was a slight temporary improvement in the pulse, but the child died after a short convulsion at 12.15 a.m.—five hours after admission.

Post-mortem Findings

The tonsils exuded pus on squeezing. The pleura and pericardium were normal. The right lower lobe was a little congested, but otherwise the lungs were healthy. The heart was normal, and the thymus was present. The peritoneal cavity contained a large quantity of dark offensive fluid containing flakes of lymph and a fair amount of greenish pus. The peritoneum was deeply injected throughout, including the peritoneal surface of the intestines and appendix, and especially in the pelvis and lower abdomen, where there were some early adhesions. The uterus and appendages appeared normal, but were not opened; the appendix was normal. The centres of the liver lobules were deeply engorged, and the spleen was soft and septic; the intestines were normal.

A swab was taken from the tonsils and another from the peritoneal fluid; *Bacillus friedlander* was grown from both.

It seems, therefore, that this was a case of primary peritonitis due to Friedlander's bacillus, and that the portal of entry was probably the tonsils.

I am indebted to Mr. R. J. McNeill-Love for permission to publish this case.

A. B. COOK, M.B., B.S.

Bethnal Green.

Reviews

DISEASES OF THE INTESTINES

Professor R. BENSAUDE, of the Hôpital Saint-Antoine, and his collaborators are producing a series of volumes devoted to diseases of the intestines. The first was favourably reviewed in these columns last year, and the second part has recently appeared.[1] Each volume consists of a series of monographs written by Professor Bensaude and one of his colleagues. After a short historical note the pathological anatomy, both macroscopic and microscopical, is considered, the clinical symptoms and *x*-ray appearances reviewed, and the appropriate treatment defined. Each section is furnished with an adequate bibliography. The present volume fulfils the promise of the first, and deals mainly with affections of the large intestine, cancer, tuberculosis, the after-effects of dysentery, abnormalities of size and position of the colon, and diverticulosis.

Diverticulosis of the colon and its complications as a result of inflammation are discussed in an interesting way. The pathology of the condition, which is recognized as an acquired disease, is fully described, with numerous original pictures of the macroscopic and microscopical appearances. The number of theories advanced as to its causation is evidence enough that none of them is completely satisfying. Diverticula are rarely caused by the traction of a tumour or inflammatory adhesions outside the bowel. The more usual cause is an increased intra-intestinal pressure associated with diminished resistance of the intestinal wall as the result of localized inflammation due to stasis, trophic disturbances, or increased size of the vascular orifices secondary to distension of the veins or deposit of perivascular fat. The diverticula protrude through the intestinal muscle wall, and when fully developed are covered only by connective tissue; peridiverticular inflammation, therefore, easily results in complications which give rise to symptoms. The *x*-ray appearances are well illustrated, particularly the "accordion pattern" of diverticulitis. Medical treatment is advocated, and surgery is reserved for complications; even then resection is said to be rarely possible, and caecostomy or colostomy is recommended. Diverticulosis of the colon is often accompanied by diverticula in the small intestine. A special section is devoted to diverticula of the duodenum, a condition which Bensaude regards as insufficiently recognized by clinicians. They are no longer a radiological or pathological curiosity, but have clinical importance also. The symptoms may be mainly those of dyspepsia, with a feeling of weight or distension in the epigastrium or right flank after meals, or they may simulate a duodenal ulcer. In some cases vomiting may be prominent and lead to suspicion of pyloric obstruction, while in other cases jaundice or interference with pancreatic digestion may occur. Diagnosis is established by *x* rays, and radiologists are now conversant with the characteristic appearances. Treatment is usually medical: bismuth and kaolin have a soothing effect. Surgery is needed to remove the cause of the trouble, but the situation of the diverticula and their close association with many important structures in the upper abdomen make operative procedures difficult.

French authors have long insisted on the differentiation of an elongation of the colon (dolichocolon) as an acquired condition from the congenital type of megacolon known as Hirschsprung's disease. In the former, medical treatment by diet, paraffin, colonic lavage, and electricity is indicated; in Hirschsprung's disease (if dilatation of

[1] *Maladies de l'Intestin*, Série ii. Par R. Bensaude *et al.* Paris: Masson et Cie. 1932. (Pp. 495; 156 figures. 70 fr.)

the anal sphincter is not successful) colostomy may be required. In a useful chapter on the subject of pain in the right iliac fossa, Oury discusses chronic appendicitis. The crucial sign is, in his opinion, discomfort in a localized area and local rigidity on careful palpation ; this should be confirmed on the *x*-ray table, when the caecum, and often the appendix also, is visualized. Chronic appendicitis is often associated with colitis and cholecystitis. When the diagnosis is made, operation is indicated ; but other sources of pain in the right iliac fossa (constipation, colitis, or pericaecal inflammation as from a diverticulum) should be treated medically. Two long sections are given to methods of identifying intestinal protozoa. Of these, the *Entamoeba dysenteriae* is the only one of importance ; the pathogenicity of the others is possible, though not proven. In cases of ulcerative colitis where the *Entamoeba histolytica* is not found, Cain suggests that tubercle may be a cause. Tuberculous ulceration of the bowel is usually secondary to pulmonary tuberculosis, and in 85 per cent. of a large series of cases the ileocaecal region was affected. Cancer of the large bowel apart from the rectum usually occurs in the caecum or sigmoid. A full description of the *x*-ray appearances is given, and of the complications that may arise from obstruction, sepsis, or local and metastatic spread of the growth. The book concludes with a section on the indications for administering subnitrate of bismuth in affections of the gastro-intestinal tract.

GYNAECOLOGICAL PATHOLOGY

The *Surgical Pathology of the Female Generative Organs*[2] is one of a series of monographs on surgical pathology produced by Dr. ARTHUR E. HERTZLER, professor of surgery in the University of Kansas. It is superbly illustrated by photographs of specimens and photomicrographs of histological preparations which compare very favourably with any that the reviewer has seen. The illustrations of themselves are sufficient to mark the book as exceptional. English publishers should take notice of the standard attained in the reproduction of photographs in recent German and American publications.

For a medical man Professor Hertzler has an unusually breezy style, with the result that he can state his case with particular emphasis and he can relieve arid descriptions by outbursts of scathing criticism. His remark on the baneful effects of useless operation, in the preface, and on unnecessary castration in women, in the text, illustrate this point, but the most striking example is found in the chapter on adenomyomas and endometriomas. Referring to aetiology he says:

> "To assume that endometrial tissues have been introduced from without has not yet passed the hypothetic stage. Whether endometrial tumours occur independently of ovarian cysts lacks demonstration. Nevertheless, the hypothesis is an interesting one and should be nursed along, but to use the hypothesis as an explanation for the genesis of myomas, carcinomas, displacements, dysmenorrhoea, contract bridge, and conjugal unhappiness should not be allowed to extend beyond the laboratory. Some of the honours should be left to visceroptosis, Jackson's membrane, Lane's kink, and chronic appendicitis."

Nevertheless, the criticism of the current views in the discussion of the literature at the end of the chapter is very shrewd, although Professor Hertzler is a little unfair to Jacobsen's work. The monograph cannot be considered to be an outstanding contribution to gynaecological pathology, for the treatment in the text is much too superficial for gynaecological requirements. No doubt it will be of great service to those general surgeons of America who assume the responsibility of dealing with surgery in all its ramifications, and as one of a series of monographs will be worthy of attention. But in some places—for example, in the paragraphs on urethral caruncles—the descriptions are insufficient for the requirements of English qualifying diplomas. Similarly, some subjects are discussed from the point of view of the general surgeon without due emphasis upon the strictly gynaecological aspect. Much of the material illustrated seems to be of great value, and some of the ovarian tumours have never been accurately described. It is doubtful if the tumour illustrated as a Krukenberg tumour was of this type, and the comparison between kidney tumours and ovarian sarcomata is unsound. The references are very scanty, and are almost limited to American publications.

The general purpose of the book can be praised, but in the next edition Professor Hertzler might conveniently avail himself of the help of someone whose interests are limited to the female generative organs. The monograph has great possibilities if suitably expanded.

[2] *Surgical Pathology of the Female Generative Organs.* By Arthur E. Hertzler, M.D. Philadelphia, Montreal, and London: J. B. Lippincott Company. 1932. (Pp. xxi + 346 : 285 figures. 21s. net.)

THE HUMAN ORBIT

It is a phenomenon of some note that a second edition of WHITNALL'S *Anatomy of the Human Orbit*[3] should have been called for. This book is a monograph on a fairly restricted portion of the human body, and it contains over 400 pages of text, 212 figures, and a bibliography of about 700 papers. Monographs based on some area of regional anatomy have never been common, and, indeed, monographs on any part of medical science have not been a special feature of English medical publications. It is the more remarkable that this one should have sprung from an attempt to make available for students a text that would help them to face a particular examination. It is therefore worthy of mention that among ophthalmologists, at any rate, there must be a body of teachers and students intellectually tough enough to buy and read a volume of the dimensions of the one under review. The book deals with the regional anatomy of the orbit and some of the accessory structures of vision. It is not concerned with the eye itself. Divided into four parts, the first is devoted to the osteology of the orbit ; the second to the eyebrows, the eyelids, the conjunctiva, and the lachrymal apparatus ; the third to the muscles, blood vessels, and nerves ; and the last to the cerebral connexions of the nerves entering the orbit. In the new edition, which follows the same plan as the first, there are small additions to the text, some new figures, and an improvement of some of the previous ones. The work involved in the collection of all the information presented in this volume, its collation, testing, and critical examination, represents a colossal task. The author has placed ophthalmologists and anatomists deeply in his debt. The ophthalmologists have expressed their debt by presenting to Professor Whitnall such awards as they can give and by buying and reading the book. They will show their appreciation further—for whoever among them essays the task of preparing a textbook of ophthalmology will find in this monograph a mine of information ready for use. The description of the anatomy of those parts of ophthalmology included in this book is complete, excellently presented, and clearly written. It is possible to differ from the author on minor points: on some matters one would be more dogmatic and on others demand more extended treatment.

[3] *The Anatomy of the Human Orbit and Accessory Organs of Vision.* By S. Ernest Whitnall, M.A., M.D., B.Ch.Oxon. Second edition. London: H. Milford, Oxford University Press. 1932. (Pp. xii + 467 ; 212 figures. 25s. net.)

An author who attempts a monograph has usually little to hope for ; he might even be regarded as fortunate in finding a publisher willing to accept the risk of publication. To be asked for a second edition is remarkable, and Professor Whitnall deserves hearty congratulations.

OPERATIVE DENTAL SURGERY

The third edition of Mr. J. B. PARFITT'S *Operative Dental Surgery*[4] is a work that justifies Sir Frank Colyer's opinion, expressed in the preface to the latest issue of his *Dental Surgery and Pathology*, that the manipulative details of everyday dentistry are best left to a book dealing specifically with the subject. The work comprises some 400 pages, with no hint of redundancy—in fact, we should like to see the author enlarge his chapter on the operation of extraction to include a more detailed account of its difficulties and how to anticipate them. The bulk of the book is extremely practical. There are valuable notes on lighting the surgery and the use of the headlamp ; on general cleanliness and on aseptic methods applied to instruments in everyday use ; on pain-saving in the filling of teeth ; on the care of children's teeth (and we note that the author advises a visit to the dentist every six weeks or two months during the pre-school age). Discussing dental caries, the author allows himself to indulge in the luxury of a hope that the work of Mrs. Mellanby and of Broderick has brought prevention within sight. On the subject of filling materials he notes that the much maligned material, amalgam, stands now in higher repute than ever. He seems dubious about the retention of pulpless teeth in the mouth, though if even the modest claims made for ionic medication in the chapter on that subject should prove well founded he might well take a more hopeful outlook on root-filling ; he remarks that "a tooth properly filled with gold is hygienically in as good condition as if it had never decayed at all." In the chapters on inlays of gold and of porcelain, and on crowns of various sorts, "bridges" are not mentioned ; but perhaps they belong to the "workroom" side of dentistry, which the book is not designed to include.

MARGARET McMILLAN

To give some account of the life and work of Margaret McMillan, and to attempt to portray her personality, was a task that had to be undertaken, and was well worth doing. It has been accomplished quite effectively in a small volume entitled *Margaret McMillan : Prophet and Pioneer*,[5] by Dr. ALBERT MANSBRIDGE. The book will probably be read mainly by those who knew Miss McMillan, or at any rate by those who had perhaps seen her and had some connexion with the fields of activity in which she was so abundantly engaged. To such readers it cannot fail to be full of interest and enlightenment ; and to others it will afford a vivid presentment of an ardent, insurgent, and impressive personality, which was not without features that could properly be described as "odd" and even "cantankerous"—adjectives used in the book itself in tributes from admiring friends who knew her well. The praise which should be given to the work of Margaret McMillan in Bradford and in London must indeed be high. There is nothing lacking in Dr. Mansbridge's biography on this score. It would perhaps be unfair, with reference to a book of this kind, to complain that the heroine is kept throughout in a brilliant, if not glaring, limelight, and that the impression is definitely conveyed that she was the sole, or at any rate by far the most important and effective, pioneer in the movements in which she was interested. This is particularly so in regard to the efforts to improve educational methods and to promote the health of school children through medical inspection and treatment, and by other means. There were a number of other pioneers in this movement whose influence is held by many to have been more effective than Miss McMillan's. Indeed, it is not too much to say that there were times and places in which the particular activities of Bradford and the peculiar methods of Miss McMillan were a distinct handicap, and even hindrance, to those who, in less provocative and tempestuous ways, were successfully pursuing the same ends. No doubt there were seasons and localities in which the one method rather than the other was the more appropriate, but to ignore the efforts and influence of those who worked by methods other than those that were natural to Margaret McMillan tends to place matters in a false perspective. Incidentally, the action of the organized medical profession should not be overlooked. It was generally admitted at the time that the reasoned advocacy of medical inspection and improved health methods in schools by the British Medical Association was a paramount influence in causing the medical inspection of school children to be accepted as a policy by the Board of Education and the Government in 1906, and its statutory enactment as a duty of local education authorities in 1907. This fact is nowadays too often forgotten, and it receives no recognition in the volume under review.

The omission may, however, be readily excused ; and it is gratifying to find due record and acknowledgement of the part played by Dr. James Kerr and by Sir Robert Morant, who is properly described as a "truly great man, supreme in his time as a civil servant, with unique powers of constructive administration," and as "a veritable driving force"—this, be it remembered, even before he was entrusted with the difficult task of initiating the administration of national health insurance.

NOTES ON BOOKS

The ninth volume (Plastic operation–Multiple sclerosis) of the New German Dictionary of Practical Medicine,[6] edited by Professor George Klemperer and the late Professor Felix Klemperer (who died at the age of 65 on April 2nd), contains the following articles by well-known authorities: A critical survey of the present state of plastic operations, by Professor E. Holländer of Berlin ; diseases of the pleurae, by Professor O. Bruns of Königsberg ; smallpox and vaccination, by Professor H. A. Gins of Berlin ; polycythaemia, by Professor G. Klemperer and Dr. P. Fleischmann of Berlin ; progressive spinal muscular atrophy, by Professor H. Curschmann of Rostock ; general paralysis, by Professor Wagner-Jauregg of Vienna ; diseases of the prostate, by Dr. R. Lichtenstein of Vienna ; psoriasis, by Professor F. Pinkus of Berlin ; psycho-analysis, by Dr. Edith Jacobssohn and Professor A. Kronfeld of Berlin ; psychopathy and psychosis, by Professor H. W. Gruhle of Heidelberg ; acute pyelitis, by Professor S. Isaac of Frankfort ; pyelitis and pyelonephritis, by Dr. S. Perlmann of Berlin ; rickets, by Dr. K. Huldschinsky of Berlin ; rubella and other acute infectious erythemata and exanthemata, by Dr. W. Keller of Heidelberg ; glanders, by Professor H. Hetsch of Frankfort ; spinal cord tumours, by Dr. E. Guttmann of Breslau ; relapsing fever, by Professor C. Hegler of Hamburg ; spinal deformities, by Professor G. Hohmann of Frankfort ; dysentery, by Professor H. Hetsch

[4] *Operative Dental Surgery*. By J. B. Parfitt, L.R.C.P., M.R.C.S., L.D.S. Third edition. London: Edward Arnold and Co. 1931. (Pp. vii + 405 ; 141 figures. 21s. net.)

[5] *Margaret McMillan : Prophet and Pioneer*. By Albert Mansbridge, C.H. London and Toronto: J. M. Dent and Sons, Ltd. 1932. (Pp. xxv + 178 ; illustrated. 6s. net.)

[6] *Neue Deutsche Klinik*. Herausgegeben von Professor Dr. Georg Klemperer und weiland Felix Klemperer. Neunter Band. Berlin und Wien: Urban und Schwarzenberg. 1932. (Pp. 798 ; 204 figures, 1 plate. Paper cover R.M.30, bound R.M.36.)

of Frankfort ; scarlet fever, by Professor U. Friedemann and Dr. D. A. Elkeles of Berlin ; schizophrenia, by Professor H. W. Gruhle of Heidelberg ; sweat cures, by Professor A. Strasser of Vienna ; sea-sickness, by Professor E. Starkenstein of Prague ; septic diseases, by Professor K. Bingold of Nuremberg ; and multiple sclerosis, by Professor H. Pette, Hamburg.

Two more slim volumes in the Illustrated Practical Medicine Series have now appeared. Professor P. VALLERY-RADOT and Dr. F. CLAUDE write on Bronchial Asthma,[7] giving a satisfactory clinical study, but failing to draw attention to any of the modern work on aetiology. This is because they quote almost wholly from French literature and exclude American, British, and German results, with the exception of a description of the Prausnitz-Küstner reaction. The second monograph, Hypertrophy of the Thymus,[8] by Professors G. MOURIQUAND and M. BERNHEIM, suffers from a similar disadvantage, for although an appended bibliography is certainly international in scope it omits the report of the Medical Research Council which seemed to end the story of " status lymphaticus." Professor Mouriquand's views on this are well known, and he marshals his evidence in a manner which would be almost convincing if it were not for the statistical data of the English report. Other aspects of thymic enlargement are well described.

Under the title The Blood Pressure Regulator Tone in its Significance for Parasympathetic Tone and Sympathetic Tone,[9] Professor H. E. HERING has written an important monograph dealing with modern work on the regulation of blood pressure through the carotid sinus mechanism and the aortic nerves. He gives his reasons for using the term " Blutdruckzügler " for the controlling mechanism—the most literal translation of " Zügler " being " bridle "—and he makes very careful choice of the terms employed throughout his somewhat complicated essay. His conclusion is that the tone of the blood pressure regulator mechanism, comprising the sinus and aortic centripetal nerves, stimulates parasympathetic tone and depresses sympathetic tone, the initiating stimulus for the tone of the regulator being the blood pressure. This conclusion, thus barely stated, is not, perhaps, a fair way of describing the monograph, for it does less than justice to the logical way by which it is reached. To the many workers now engaged on research into this fascinating development of physiology Professor Hering's book will be most useful.

It is not the fault of Professor KISCH that his admirable monograph[10] on alternation of the heart does not succeed in removing the phenomenon and its associated sign, pulsus alternans, from the *index expurgatorius* of the careful practical clinician. It is difficult in a small space to do justice to the completeness of this useful work, for a more thorough account of all the aspects of alternation has not before appeared. The phenomenon is demonstrated with certainty only by instrumental methods, whose chief use is to establish the absence of certain conditions which can easily be confused with it ; its pathology is not yet understood, in spite of the great amount of research carried out by Professor Kisch and others in the past twelve years ; moreover, as cases of its occurrence in apparently healthy people over numerous years of active life are recorded, no one can say whether it is a sign of disease at all, or what its influence upon prognosis is. It seems well established that it does not appear alone as a sign of myocardial disease, but in the presence of other signs of organic impairment of ascertained gravity. We may conclude that alternation of the heart has now by experience been found not to be the dire omen of approaching dissolution it was once thought to be.

For its second edition the *United States Army X-Ray Manual*[11] has been rewritten and edited by Lieut.-Colonel H. C. PILLSBURY. Originally designed, during the last war, as a guide to radiologists in military hospitals and as a textbook for instruction, it was intended to cover the problems of military service. The new edition has been modified to serve equally well in peace ; it has been expanded to incorporate descriptions of the improved apparatus now in use, and of the revised methods of interpretation developed during the post-war years. Certain changes in the arrangement of the sections conduce to easy reference. The book is well illustrated and indexed, and should rival the popularity of its predecessor.

The Inhumanists[12] is a sensational account of the doings of resurrectionists in the days before the passing of the Anatomy Act, written in a lively narrative style. It does not contain any record of fact that may not be found in Bailey's *Diary of a Resurrectionist,* to which the author is obviously indebted.

[7] *L'Asthme Bronchique.* Par P. Vallery-Radot et François Claude. La Pratique Médicale Illustrée. Paris: G. Doin et Cie. 1932. (Pp. 54 ; 2 figures. 16 fr.)

[8] *Hypertrophie du Thymus et Etats Thymo-Lymphatique.* Par G. Mouriquand et Marcel Bernheim. La Pratique Médicale Illustrée. Paris: G. Doin et Cie. 1932. (Pp. 50 ; 4 plates. 20 fr.)

[9] *Der Blutdruckzüglertonus in seiner Bedeutung für den Parasympathikustonus und Sympathikustonus.* Von Professor Dr. H. E. Hering. Leipzig: G. Thieme. 1932. (Pp. 48. M.3.)

[10] *Der Herzalternans.* Von Dr. Med. Bruno Kisch. Band ii. Dresden und Leipzig: Theodor Steinkopff. 1932. (Pp. xii + 213 ; 54 figures. RM.20 ; Geb. RM.21.50.)

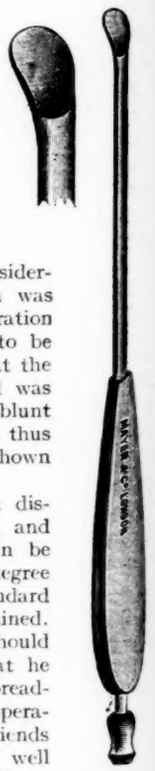
[11] *United States Army X-Ray Manual.* Second edition, rewritten and edited by Lieut.-Colonel H. C. Pillsbury, M.D., U.S.A. London: H. K. Lewis and Co., Ltd. 1932. (Pp. xvi + 482; 228 figures. 25s. net.)

[12] *The Inhumanists.* By Cecil Howard Turner. London: A. Ouseley, Ltd. 1932. (Pp. ix + 286. 8s. 6d.)

PREPARATIONS AND APPLIANCES

MINIMIZING AFTER-PAIN OF TONSILLECTOMY

Mr. A. LOWNDES YATES writes:



An investigation of cases has shown that the degree of pain which follows the operation of tonsillectomy is in proportion to the degree of trauma which has been inflicted on the tissues. The degree of pain which followed different operative methods was observed, and I concluded that comfortable convalescence was secured only when each movement of the dissecting instrument was clearly visible within a bloodless operative field. I found that dissection by gauze or sponging of the fauces produced considerable after-pain. When semi-blunt dissection was employed and the blood was removed by aspiration the results were better, but still left much to be desired, for in a case of difficulty, excepting at the instant of the aspiration, the operative field was rarely bloodless and the movements of the blunt dissector were not fully visible ; trauma was thus inflicted on the areas which experience had shown gave rise to after-pain.

I have therefore combined the semi-blunt dissector with the aspirator in one instrument, and find that by its means a bloodless field can be secured and all manœuvres made with that degree of firm precision which is required if the standard of post-operative comfort is to be maintained. This standard is that the adult patient should have such a limited degree of after-pain that he can take a breakfast of boiled eggs and bread-and-butter upon the morning following the operation, and in the afternoon can talk to his friends without undue discomfort. The illustration well describes the instrument, which is made by Mayer and Phelps. It is hollow, and the blood escapes up the lumen in the shank and handle of the instrument into the bottle of the aspiration apparatus.

Concentrated liquid liver extract (B. W. & Co.) is a preparation recently issued by Messrs. Burroughs Wellcome & Co. One fluid ounce is equivalent to eight ounces of fresh liver. It is a palatable preparation which can be used to supplement or to replace fresh liver in the treatment of pernicious anaemia.

British Medical Journal

SATURDAY, SEPTEMBER 10th, 1932

POLIOMYELITIS—PAST AND FUTURE

There is a deeply rooted tendency in the human mind to dismiss unpleasant recollections as soon as possible. From this weakness our profession is not immune, and, like Pharaoh of old, we are apt to forget the plague which has passed and to ignore its lesson when the immediate danger has been removed. Of epidemic diseases none has had a more variable incidence than poliomyelitis. In 1916, in New York State alone, no fewer than 20,000 persons were affected, with 5,000 deaths and 12,000 cases of residual paralysis. In the same State within a few years infantile paralysis had taken its place as a sporadic disease of comparatively small economic importance. Outbreaks of less severity have occurred at intervals in the British Isles. In 1910, in an isolated West Country village, forty-five persons out of a population of 119 were attacked ; in 1926 an epidemic among school children occurred at Broadstairs, and in 1928 one of 275 cases was recorded in Scotland. Since that time this country has been spared, save for sporadic cases, and for the last three years the morbidity rate has varied between one and two per 100,000. Other lands have not been so fortunate. In the last four years the numbers affected have progressively increased in Australia, while in 1931 epidemics occurred in Austria, Hungary, and Switzerland. Knowing what poliomyelitis has done in the past, who shall predict its activities in the future? It is reasonably certain that sooner or later the profession will be called upon to deal with another epidemic in this country, and it is opportune at this period of relative immunity to review our present knowledge of the disease and more particularly the means at our disposal for combating its legacy of death and paralysis.

By the experimental work of Landsteiner and Popper in 1909 and of Flexner and his co-workers in immediately succeeding years, it was established that the disease is due to the invasion of the nervous system by a specific filterable virus, which up to the present has escaped absolute identification. Further investigations have shown that an attack of the disease in man or monkeys is followed by the development of an active immunity in the victim, should recovery occur, and that the serum of convalescents is capable of inactivating the virus *in vitro*. These fundamental researches formed the theoretical basis for the serum therapy later to be evolved. From the epidemiological point of view it appears likely that the disease is transmitted by carriers among the healthy population rather than by case-to-case infection. It is estimated that of the carriers not more than 3 per cent. develop the disease, and that in a community subject to an epidemic the carriers outnumber the clinical cases by three to one. The great variability in the severity of the disease is to be related to the degree of immunity already established in the population by previous contact with carriers. These considerations are of great importance in the administration of a community attacked by an epidemic. The clinical features of the disease and its very varied manifestations cannot be discussed here, our concern being rather with its treatment, which must logically be preceded by correct diagnosis. From the diagnostic point of view poliomyelitis presents itself in three phases: (1) the pre-paralytic stage ; (2) the stage of recoverable paralysis ; (3) the stage of permanent paralysis. These phases pass imperceptibly into one another, and arrest of the disease may occur at any one of them.

In the past, when treatment of the disease was confined to the general measures adopted in any acute fever, together with complete rest to the paralysed muscles, the diagnosis of the disease in the pre-paralytic stage was not of vital importance. Since the introduction of immune therapy, however, and particularly since the publication of the experiences of Macnamara and Morgan in the Victoria outbreaks, it is clear that an early diagnosis is essential for any specific treatment. Such diagnosis will vary in difficulty according to the presence or absence of an epidemic. The earliest features are fever, headache with signs of meningeal irritation, pain on flexing the spine, tremor, and frequently nystagmus and cutaneous hyperaesthesia. Changes in the cerebro-spinal fluid are constant, and in over 90 per cent. of cases in the pre-paralytic stage examination of the fluid reveals an increase in the cells with a varying proportion of polymorphonuclear cells and lymphocytes, and an increase in albumin without any change in the chlorides or sugar. With the advent of paralysis the diagnosis is usually obvious, but by then the ideal moment for treatment has passed. The basis for specific therapy lies in the experimental work of Flexner and Lewis, and Landsteiner and Levaditi, already referred to, and its practical application is due largely to Australian workers, especially to Macnamara. During the years 1925–31 the treatment of the disease in Victoria was the subject of a special commission, and its execution was concentrated in a small consulting medical staff. Public appeal for donors of convalescent serum was made, the serum so obtained was pooled, and its strength standardized and repeatedly tested. Using this serum, Macnamara during four years treated 133 cases in the pre-paralytic stage. Of these, sixty-six patients recovered without any evidence of paralysis at any time, sixty showed some paresis, which cleared up in a few weeks, six developed permanent paralysis, and one died. These results are strikingly favourable as compared with those obtained in an epidemic treated on a non-specific basis. It must be admitted that the observations were not scientifically controlled, as it was impossible to withhold serum from alternate cases treated. Similar favourable reports were made by Robertson in New Zealand, but workers in America in 1931, treating alternate cases only with the serum, were undecided as to its influence on the course of the

disease. Although the work clearly needs confirmation the evidence is strong that in human convalescent serum we have a therapeutic agent of value in the treatment of poliomyelitis. From Macnamara's results certain definite facts emerge. At the present time human immune serum is the only safe agent available, immunized horse serum producing a reaction which is unfavourable to the patient. It is essential that the serum should be administered in the pre-paralytic stage—from the first appearance of paralysis its beneficial effect rapidly declines, and within a few days of the onset of paralysis serum is useless. The examination of the spinal fluid should be made at the bedside, and if the diagnosis is confirmed the serum should be administered immediately without the withdrawal of the lumbar puncture needle. Serum should be given in adequate amount by the thecal and intravenous routes. Clinical observations confirm the experimental findings of Flexner and Amoss that the administration of an inactive serum is not only useless but actually harmful, as it appears to increase the susceptibility of the nervous system to the virus.

Turning now to the practical application of these facts in this country, two difficulties immediately present themselves. In the present sporadic incidence of the disease its diagnosis in the pre-paralytic stage is extremely difficult—often impossible. Neither the public nor the profession are constantly on the watch for the condition as they are during an epidemic, and the majority of cases proceed either to paralysis or to complete recovery with their identity unsuspected. In the second place no supply of immune serum is at present available to the profession at large. Such supplies as exist are in the hands of private individuals and in a few hospitals and research institutions. This state of affairs is manifestly an undesirable one in view of the technical difficulties involved in the preparation of a sterile and active serum without the use of any antiseptic, the necessity for proper standardization, and the proved harmful results following the use of an inactive preparation.

The only rational remedy is the preparation by the public health authorities of a supply of the serum which shall be available to the profession. This is likely to be an undertaking of considerable magnitude, but the published results would appear to justify it. Now, surely, is the time to make the effort.

DUPUYTREN'S CONTRACTION

Dupuytren's contraction has been known since 1610, but the exact nature of the condition was first demonstrated by dissection in 1831 by the French surgeon whose name has since been given to it. The palmar fascia forms an incomplete sheath to the palm, which serves as a protection to the deeper structures. It is also connected by fibres superficially to the skin and deeply to the deeper fascial planes. These connexions hold the structures of the palm in place and produce the folds in the skin when the hand is opened or closed. The slips of fascia which extend to the fingers each separate into a central band and lateral slips, which encircle the tendon sheaths and are inserted into the sides of the first and second phalanges. When the fascia contracts these slips pull down the fingers and flex them at the metacarpo-phalangeal and first interphalangeal joints.

Davis and Finesilver, in a review of this condition,[1] point out that it is a mistake to believe that Dupuytren's contraction occurs most often in manual labourers. There is no strong evidence that repeated trauma is important in the aetiology. Fully 50 per cent. of the cases occur in the non-labouring class; the condition is very often bilateral, the left hand is involved as often as the right, and the contraction only arises after middle age—that is, after the most strenuous working years. In any list of cases all sorts of occupations are found, and there seems to be very little evidence that occupation has anything to do with the causation, although it is possible that trauma or irritation of the palm may render the condition more actively progressive when it has once arisen. Women are affected much less often than men, and in them the contraction is usually not severe. Practically all recorded statistics show that there is a strong hereditary tendency. In many cases pads are present on the dorsal aspect of some of the first interphalangeal joints (Garrod's pads), and it is not unusual to find these pads in some members of a family and contraction of the palmar fascia in others. Gout and rheumatism have been suggested as causes of the condition. It is true that many of the sufferers have had symptoms of these, but this is rather to be expected in a condition which chiefly affects elderly people. A considerable proportion of patients with Dupuytren's contraction suffer from diabetes. Davis and Finesilver examined 200 unselected cases of diabetes and found among them six cases of contraction of the palmar fascia. In a control investigation of 641 other persons of similar age there were only seven cases of contraction, so it seems as if there were some connexion between the two conditions. Little is known about the pathology of the contraction, except that there is an inflammatory hyperplasia leading to the production of densely hard fibrous tissue, and that cultures taken from the tissues have invariably proved sterile.

Treatment carried out by internal medication, by massage, stretching, splinting, and injection of such substances as fibro-lysin and humanol has all proved of little value. *X*-ray treatment has been tried and has resulted in a little softening and relaxation of the contracted tissue. Further investigation of this line of treatment is required. At the present time the treatment of Dupuytren's contraction is essentially surgical, either by subcutaneous division of the dense bands or by removing them completely by dissection. There is some difference of opinion among operating surgeons as to the relative merits of these two procedures. The

[1] "Dupuytren's Contraction, with a Note on the Incidence of the Contraction in Diabetes." John Staige Davis, M.D., and Edward M. Finesilver, M.D. *Archives of Surgery*, vol. xxiv, No. 6, p. 933.

undoubted tendency to recurrence after subcutaneous division is avoided if the affected bands are thoroughly removed. But on the other hand the contraction sometimes affects the skin to which the fascia is tightly adherent. When this is the case removal of the band is difficult, and the scar after operation may contract badly. If the skin is much involved it may be advisable to remove portions of it when the bands are dissected out, and to replace it afterwards by using a pedicle flap. This method has been advocated by Lexer, but has not been much followed in this country.

This condition is very disabling. As it most often comes on in elderly people and progresses rather slowly, those who suffer from it can usually adapt themselves to the increasing disability. For this reason operative treatment is often postponed until the contraction is so severe as to make it difficult. The operation of complete removal is not a simple one, and unless the fascia is completely removed recurrence is probable. These circumstances probably account for the fact that the operative treatment of Dupuytren's contraction is not popular and that many elderly people carry on with badly contracted fingers.

HIGH MATERNAL MORTALITY: A SURVEY

Closely following the issue last month of the final report of the Departmental Committee on Maternal Mortality and Morbidity comes an almost equally instructive Ministry of Health publication entitled *High Maternal Mortality in Certain Areas*.[1] In a prefatory note Sir George Newman states that for some years an exceptionally high maternal death rate has been in existence in the areas concerned, and that a detailed investigation seemed desirable to see whether fresh light could be thrown on the causes, whether maternity and child welfare organization was adequate, and, if so, why it had apparently failed to secure an improvement in the state of affairs. He concludes by saying that the excessive maternal mortality in the areas of certain county boroughs and county councils is one of the principal contributions to the high average mortality rate in childbirth for the country as a whole: this rate can be reduced by proper and effective means. The report itself comprises a survey of conditions in the West Riding of Yorkshire, in Lancashire, and in Wales. It deals, as Dame Janet Campbell points out in her introduction, less with clinical aspects than with conditions "which may affect, predispose to, or cause an excessive death rate associated with child-bearing," and with administrative arrangements for maternal welfare. Conditions obtaining in the large industrial town, the industrial county, and the rural county are exemplified in each of the three areas. A striking feature is the fact that excessive mortality is attributable to complications of childbirth in a greater degree than to puerperal sepsis. Poverty, unemployment, bad housing, nutrition, minor ailments, home supervision, and "the woman herself" all come under discussion. Dame Janet Campbell emphasizes the need in ante-natal supervision of keeping both doctor and midwife fully informed of the patient's condition. In connexion with the difficulties of getting in touch with pregnant women (especially primiparae) sufficiently early to make pre-natal supervision worth while, she mentions the system which has been tried at Huddersfield—namely, the payment of a fee of 2s. 6d. to any doctor or midwife who, with the consent of the patient, notifies a pregnancy to the medical officer of health. As regards maternity hospitals it is suggested that the high death rate might be reduced if difficult cases and emergencies came from the beginning more directly under the definite control of a senior and experienced member of the staff. Abortion as a cause of maternal mortality secures particular consideration in the report, as does the question of instruction in the use of contraceptives. In conclusion Dame Janet Campbell states that the problem of maternal mortality is many-sided, that there is no one simple solution, and that ultimate success can only be obtained by simultaneous progress in several different directions. These would include a better-informed public, a healthier environment during infancy, childhood, and adolescence, and "the supply of the obstetric requirements of an adequate maternity service. The . . . solution will only come through the gradual establishment of a higher standard of ordinary clinical midwifery practice." A detailed consideration of the three areas follows. In the towns of the West Riding, the need for greater attention to health during pregnancy and a better-organized midwifery service is emphasized. In the section on Lancashire tribute is paid by Dr. Isabella Cameron to the work of the public health authorities and voluntary organizations, though it is implied that much remains to be done: administrative arrangements should be more fully supported by public opinion and more freely used. In the section on Wales stress is laid by Dr. Dilys Jones on the education of the mother, the doctor, and the midwife, and on the need for increased service by maternity and child welfare authorities.

[1] Reports on Public Health and Medical Subjects, No. 68, 1932. H.M. Stationery Office. (1s. 6d. net.)

BACILLI IN EGGS

It has long been known that when the ovaries of birds are infected with a bacillus to which the bird has become immune the bird may lay eggs containing living bacilli. Rettger's *B. pullorum* is transmitted in this way through hens' eggs; the bacillus, fortunately, is apparently quite innocuous to human beings. A small series of cases of food poisoning with *B. aertrycke* in Europe was recently described due to the use of pigeons' eggs containing bacilli. It has lately been claimed that a small percentage of all hen eggs are infected with living tubercle bacilli, but these findings have not been widely confirmed or accepted. A discovery of graver import was made by T. Dalling and Miss G. H. Warrack, who found, in 1931, organisms of the food-poisoning group in the ovaries of ducks, and in eggs which had been laid by these ducks. They published a discreet reference to their investigations in the year-book of the Utility Duck Club in 1931, and made a report on their work at the recent meeting of the Pathological Society of Great Britain and Ireland at Oxford. They had endeavoured to find how widespread was the infection in the country, and whether a flock could be "cleaned" by testing the blood of all ducks and by eliminating those giving a positive reaction

to any of the Salmonella antigens. W. M. Scott carried the story further in the spring of this year by finding some cases of food poisoning—several of them fatal—due to the consumption of infected duck eggs. The three workers have shown that the percentage of infected eggs on the market must be very small. Ducks giving a positive agglutination result were kept at the Wellcome Physiological Research Laboratories, Beckenham, and the eggs examined ; only a small percentage of eggs from these birds, which were proved at necropsy to have infected ovaries, yielded any living organisms. Scott further showed that adequate cooking gives complete protection, for the bacilli are readily killed. It is probable that by the elimination of reactors and by proper cooking of eggs this valuable food product can be made safe for public use.

INDUSTRIAL HEALTH

The twelfth annual Report of the Industrial Health Research Board[1] records steady progress in a large number of fields of inquiry relating to this subject. The report is divided into three sections, the first of which summarizes the past work of the Board's investigators, and points out its general trend. Modern machinery has done much to ease the physiological burden thrown on men employed in the heavy industries, and has at the same time transformed many of the lighter processes into mere machine-minding. These changes in the conditions of human labour are associated with an increase in psychological problems, due to monotony and speed, and the loss of creative satisfaction. Other conditions which have to be studied depend upon the lighting, the degree of noise, and the atmospheric surroundings under which the work is carried on, whilst the effects of all these conditions reveal themselves to a considerable extent in the health of the workers, as indicated by their sickness and accident rates. Equally important investigations concern the selection of the worker and his vocational guidance. The second section of the report deals with the investigations now in progress or recently completed. For instance, an inquiry into the effects of high temperature and humidity on the physiological reactions of subjects performing heavy and light mechanical work was made in the new air-conditioning room at the London School of Hygiene and Tropical Medicine. The dry-bulb temperature of the air was found to be of great significance, as well as the wet-bulb temperature, and the tests, which were made both in summer and in winter, indicated a distinct acclimatization effect. The influence of lighting was investigated in a group of tile pressers, who were found to increase their output substantially when the illumination was improved. The influence of noise was tested on weavers, who wore ear defenders during alternate weeks. The result of the experiment was so promising that other groups of weavers are now being tested over a period of twelve months. The influence of vibration was tested in the laboratory by means of a pneumatic drill. At times this tool causes such a considerable chilling of the hands that the subsequent recovery of the circulation may take thirty to forty minutes. The psychology of light repetitive factory work was studied in relation to the effects of systems of payment, personal likes and dislikes, and social influences, in addition to effects dependent on machinery. The response to training and practice was investigated both in the factory and in the laboratory, whilst temperamental factors were investigated in telegraphists as well as in industrial workers. Absenteeism due to sickness is being investigated in various Government departments, as well as in large stores and in certain industries, whilst accidents—especially in regard to accident-proneness and its reduction by suitable selection—are being investigated in groups of men attached to the Defence Services, including the Royal Air Force, the Royal Engineers, and the Royal Tank Corps. The third section of the report describes the relations of the Board to other bodies. The work of the Board is carried on in co-ordination with the research work of ten or more Government departments, including the Home Office, the Ministry of Health, the Board of Education, the Post Office, the Mines Department, and the Ministry of Labour, whilst several investigations have been undertaken conjointly with the Department of Scientific and Industrial Research and with the National Institute of Industrial Psychology.

[1] Medical Research Council. Twelfth Annual Report of the Industrial Health Research Board, to June 30th, 1932. London: H.M. Stationery Office. (1s. net.)

LIFE AND DEATH IN THE MEDICAL PROFESSION

That indefatigable student of medical statistics Dr. F. L. Hoffman has for a parergon turned from the statistics which medical men compile to the statistics of which they are themselves the raw material. Under the above slightly grandiloquent title[1] he collects and comments upon the mortality statistics of our profession. The survey is a wide one. With the exception of Dr. Bradford Hill's analysis of the mortality of Fellows of the Royal College of Physicians,[2] all papers of any importance seem to be mentioned, and it is gratifying to our national self-esteem to find that Dr. Hoffman considers that the decennial supplements of the Registrar-General " contain the most authentic data on the subject and deserve to be studied with painstaking care." It is easy to select particular causes of death, such as suicide, whose *relative* frequency is greater in medicine than in occupations on the same social level, and to make play with the particular hardships and temptations of a doctor's career as explaining such deviations. Perhaps Dr. Hoffman is a shade too gloomy in his view that: " Whether he [that is, the doctor] wishes it or not, he must often live beyond his means to sustain the honour and the dignity of the profession. He must belong to several medical societies, social clubs, etc., must keep a car and attend conventions, all of which are additional burdens not common to many other professions." The dignity and honour of our profession can seldom be maintained by outrunning the constable, and we should be sorry to think that, for example, the Centenary Meeting of our Association is an additional burden. But the heart knoweth its own bitterness, and we are all only too familiar with the kind of experience which Dr. Hoffman has generalized. Yet perhaps what impresses one most in

[1] *Life and Death in the Medical Profession.* By Frederick L. Hoffman, LL.D. Prudential Press, 1932. (Pp. 28.)
[2] *British Medical Journal,* April 18th, 1925.

comparing the mortality rates of our own profession with those of the other secular "learned" professions is their similarity. Omitting the youngest age groups, for which the rates of mortality are based on small absolute numbers, these are the results (rates per 10,000) 1921–3:

Ages	Registered Medical Practitioners	Barristers	Solicitors
25-35...	35.7	46.2	19.6
35-45...	57.7	76.7	56.8
45-55...	122.5	124.2	118.3
55-65...	265.1	259.5	247.8
65-69...	448.9	431.4	457.7
70-	1,098.6	1,164.1	968.5

The conclusion surely is that in these professions the similarity of social and economic status, rather than the dissimilarity of occupation, is a determining factor. That, again, leads to the inference that seed rather than soil is here of importance. We have to do with persons who, as a class, are raised by both education and economic position above the grosser environmental dangers, and at that level the very obvious differences of purely occupational hazard become of minor importance. Finally, it must be remembered that in respect of both medical and legal professions the statistical classification is industrial rather than occupational. Between the way of life of a medical officer of health and a general practitioner of medicine, or between that of a legal official and a country solicitor, there is as wide a difference as between many separately scheduled occupations. It will, however, be long before some future Dr. Hoffman will have enough data to analyse separately the hazards of the various kinds of work to which members of our profession devote their lives.

"SPECIFIC" TREATMENT OF COELIAC DISEASE

In the Rachford Memorial Lectures[1] delivered before the University of Cincinnati earlier during the year, Professor Leonard Parsons summed up the evidence as to the causation of this curious malady by saying that "the probable explanation of coeliac disease lies in a change of physico-chemical nature in the absorptive mechanism of the intestine." This means, as has long been realized, that the treatment of the malady must be entirely dietetic. What is not always remembered is that the diet must be kept low in carbohydrates as well as in fats, and that on a "three-phase dietary" basis, such as that outlined by Howland, gradual improvement is to be expected. Nevertheless, as Parsons points out, progress is slow and setbacks are common, and in his admirable survey of the subject he is careful not to claim too much for any special article of food nor for any special combination of foodstuffs. In connexion with this, the title of a recent paper[2] by Dr. S. V. Haas of New York—"Coeliac disease, its specific treatment and cure without nutritional relapse"—is sufficiently provocative to warrant a very close examination of the author's claims. Dr. Haas is emphatic that whereas relapses are frequent with other methods, his diet is such that "recovery ensues in every instance without nutritional relapse." The outstanding feature of his method lies in the use of bananas, since, as he showed in 1924, ripe bananas are well tolerated in coeliac disease. Hence he begins with protein milk, one to two quarts daily (incidentally this will contain as much as four to eight ounces of 20 per cent. cream), to each quart of which are added three ounces of banana powder. In addition, ripe bananas are offered at the outset, and may be given in any quantity. After the initial anorexia is overcome the appetite becomes voracious, and frequent day and night feeding is necessary. Shortly, however, the child settles down, and by now the diet has been extended to contain beef juice or meat for older children, cottage cheese, white of egg, orange juice, and other fruits and vegetables, introduced carefully one at a time, potatoes being rigidly excepted. Dr. Haas further advises a full dose of castor oil once a week and vitamin D given early, but not in the form of cod-liver oil. Iron is also recommended for the anaemia. Should any relapse occur it will always be due, according to Dr. Haas, to the addition of carbohydrate. Even a minute amount, such as a piece of bread crust, is sufficient to cause trouble. The diet, which supplies 80 to 100 calories per pound of body weight in the quantities usually advised, is continued for a year. After six months an attempt may be made to introduce some form of the forbidden carbohydrate, and a very small amount of one—say, bread—is allowed daily with no other change for at least three months. Then milk may be given (about half to three-quarters of a pint daily) as the sole addition for another three months, and so on until a normal diet is used. The dietetic regime here summarized is the result of experience with seventy-five cases, and enough time has elapsed for Dr. Haas to be able to say "the prognosis is excellent." If his paper had appeared before the excellent survey of the whole subject by Professor Parsons it is possible that some critical suggestions would have been forthcoming. Certainly the Birmingham school has had as many cases as Dr. Haas, but it is more cautious in its estimates of prognosis.

[1] *Amer. Journ. Dis. Child.*, 1932, xliii (May, Part 2), 1293.
[2] *Journ. Amer. Med. Assoc.*, August 6th, 1932, p. 448.

DEPARTMENT OF HEALTH FOR SCOTLAND

The Secretary of State for Scotland has appointed Dr. James Law Brownlie to be Chief Medical Officer of the Department of Health for Scotland in succession to the late Dr. John Parlane Kinloch. Dr. Brownlie graduated M.B., Ch.B. at Glasgow in 1913 and M.D. (with commendation) in 1918, and obtained the Cambridge D.P.H. in 1916. He is at present one of the medical officers of the Department of Health, and has been engaged on the co-ordination of the hospital services of Scotland. He has also represented the Department on various scientific bodies and committees. Throughout the period of his service with the Department he worked in close association with Dr. Kinloch. He had previously held the posts of resident medical officer in the Glasgow Corporation fever hospitals, assistant bacteriologist in the Glasgow Corporation Laboratory, and bacteriologist and pathologist for the County of Lanark.

Sir Frederick Gowland Hopkins, P.R.S., has been unanimously adopted as president of the British Association for the ensuing year.

Nova et Vetera

SIR WALTER SCOTT AS A PATIENT

Thanks to his own pen and that of his faithful Lockhart, we have a fairly complete history of the illnesses of Sir Walter Scott, the centenary of whose death is reached this month. Scott was a man of powerful physique, with the chest and arms of Hercules but a wasted right leg, due to infantile paralysis, which accounted for his lifelong lameness. After an invalid childhood he enjoyed robust health until the last fifteen years of his life.

In 1817, at a dinner party he was giving in Edinburgh, he was seized with cramp in the abdomen, and retired from the room with a scream of agony which electrified his guests. The symptoms yielded to severe medical treatment, but he wrote a little later that he was " still as weak as water from the operations of the medical faculty, who, I think, treated me as a recusant to their authority, and having me once at an advantage were determined I should not have strength to rebel again in a hurry." To another correspondent he wrote that he had been plagued all the previous winter with these stomach pains, which he had tried to combat by drinking scalding water ; as they grew unpleasantly frequent he had recourse to his friend Matthew Baillie, but before Baillie could do anything there occurred the dinner party incident. All sorts of remedies were applied, including heated salt, used in such a way that it burned his shirt to rags, though he hardly felt it when it was " clapped to his stomach." Profuse bleeding and blistering, " under higher assistance," saved his life. Dr. Salusbury MacNalty in *The Great Unknown* (Epsom: Birch and Whittington, 2s. 6d.) regards these attacks as almost certainly gall-stone colic.

In succeeding years there were returns of this colic at intervals ; opium seemed to be the only medicine to stay the pains, and this produced such depression that, as he half-humorously said, it became a " pull-devil pull-baker " contention, " the field of battle being my unfortunate praecordia." In more jest about his malady he compared what was taking place in the region of his diaphragm with the process whereby the " de'il " was said by Burns to make a " king's head " (meaning one of the stomachs of ruminating beasts) into a spleuchan, or Highlander's tobacco pouch. Ultimately he got better, thanks to calomel, introduced to him by a Dr. Dick of the East India Company. " The origin of the complaint, it seems," wrote Scott, " is some derangement in the gall-bladder leading to the formation of obstructions in the biliary ducts, whence arise cramps, fits of sickness, spasms, jaundice, and all the evils that have undone me." Calomel, used in very small quantities, was, " Lord love its heart," an absolute specific. Ten days' rigid attention to Dr. Dick's directions restored him to action, to appetite, and to healthy digestion.

The first premonition of an illness against which calomel would be unavailing came in 1822, ten years before his death, when he spoke of " a whoreson thickness of blood and a depression of spirits . . . and *Peveril* will, I fear, smell apoplexy." Three years later he had violent pains in the right kidney and parts adjacent, which forced him instantly to go to bed and send for Clarkson, the Montrose surgeon, who pronounced it gravel augmented by bile. He was better next day, but uncomfortable from the effects of calomel, " which is like the assistance of an auxiliary army, just one degree more tolerable than the enemy it chases away." Haemorrhages developed in the summer of 1829, after weeks of headaches and nervous prostration, and copious cupping was done. Cupping, said Scott, was not painful, but it was rather like a giant twisting your flesh between his finger and thumb.

In February, 1830, came a paralytic seizure, after which he submitted to a severe alimentary regimen, tasting nothing but pulse and water for weeks. At the end of that year he experienced slight vertigo on going to bed, and on the advice of Dr. Abercrombie abandoned his daily cigar, and cut down by one-half his daily ration of a wineglassful of spirits. In the following April he had a stroke of paralysis affecting both nerves and speech. His Continental journey, the onset of his fatal illness, his return to London, where he was attended by Sir Henry Halford, and his final journey, a dying man, to his beloved Abbotsford, are too well known to need recounting.

THE BRITISH ASSOCIATION

ANNUAL MEETING IN YORK

The meeting with which the British Association for the Advancement of Science entered upon its second century was held in York from August 31st to September 7th. In this city the association had its birth in 1831, and here it has now held five of its annual meetings. On the present occasion, in view of the fourteenth International Physiological Congress at Rome, the Section of Physiology was not represented, but there was no lack of papers and discussions on matters of interest to the medical profession.

PRESIDENTIAL ADDRESS

In his presidential address, Sir Alfred Ewing invited the association to reflect upon the changed temper of the scientific investigator. Cocksureness had given place to a frank admission by scientists that they we e tentatively grasping what were at best only half-truths. This new spirit was strengthening a sense of brotherhood between the scientific adept and the average man, who listened gladly when the specialist confessed that in matters of science the only dogma was that there was no dogma. In this period of social and economic discontents, moreover, the ordinary citizen could not but realize that if only it were possible to apply the dispassionate temper of science to the difficulties of the hour we might face them with a better-founded hope of settlement. Having then given a lucid exposition of present-day theory and investigations of the structure of the atom, stressing in particular the evidence that had been adduced that year by Dr. Chadwick of the Cavendish Laboratory for the existence of the neutron, and the recent work of Drs. Cockcroft and Walton, disciples of Lord Rutherford, who had applied their mastery of electrical technique to projecting single protons into the nucleus of lithium, the president proceeded to survey the history of the association and to assess its influence on the progress of science. Between pure and applied science, he said, there was a close partnership and a constant interchange of advantage. No discovery, however abstract, was safe from being turned to practical account: few if any applications, on the other hand, failed to react in stimulating discovery and providing the experimentalist with more effective weapons of attack. Among the inventions which had revolutionized the habits of modern man some were developed by steps that were mainly empirical ; for others, especially the more recent, science had been the incubator and forcing house. The fact, for example, that the rays from a radio station became bent in the upper regions of the atmosphere was recognized and applied by Marconi before anybody had a rational explanation to suggest. Speaking broadly, however, it was scientific nursing that had brought the infant art of communication by wire and wireless to the splendid manhood which now blessed the nations of the earth. He had used the word

"blessed" deliberately; but towards much that was called mechanical progress the present-day thinker was conscious of a changed attitude. There was a sense of perplexity and frustration, as in one who had gone a long way and found he had taken the wrong turning. Watching the sweeping pageant of discovery and invention it was impossible not to ask, Whither does this tremendous procession tend? What may be its influence upon the future of the human race? The cornucopia of the engineer had been shaken over the earth, scattering an endowment of previously unimagined capacities and powers. But man was ethically unprepared for so great a bounty; the command of Nature had been put into his hands before he knew how to command himself. Machinery was delivering a stream of articles in the creation of which the workman had little part. He had lost the old satisfaction of something accomplished through the exercise of care and skill. In many cases he had had thrust upon him an unemployment that was more saddening than any drudgery. He could not tell, said Sir Alfred Ewing, where we should look for a remedy. Even in Utopia, which achieved a perfect adjustment of labour and the fruits of labour, man would still have to learn how to spend the leisure his mechanical slave had obtained for him. Only by arduous seeking would he find the spiritual betterment that would qualify him to use wisely the fruits of creative ingenuity.

Optical Activity of Living Tissues

Dr. W. H. Mills, president of the Section of Chemistry, opened a discussion on stereochemistry by an historical review, from which he passed to a highly speculative interpretation of the origin of the dissymmetry that characterizes the molecules of living things. Stereochemistry began, he said, with Pasteur's discovery of a form of tartaric acid that rotated polarized light to the left and his subsequent realization that every optically active substance must have its antipode. It was this doctrine of molecular dissymmetry, later developed by van 't Hoff and Le Bel, that led to the conception of a three-dimensional arrangement of the atoms in a molecule, the pattern of which served to interpret many of its properties. Further developments followed on the formulation of the electronic theory of the atom, and these had made yet more fruitful the view that spatial models of even the most complex molecules could illustrate the actual structure of chemical compounds. Turning now to the strange fact that living organisms were composed of only one set of the mirror-image pairs of dissymmetrical molecules, though theoretically the presence of both was possible, the lecturer postulated an ingenious theory in which the phenomena of optical activity were linked up with those of growth. In a primitive undifferentiated vegetable organism, he said, the existing tissue built up tissue of the same nature as itself from the materials of its inorganic environment. There existed thus an association of compounds capable of synthesizing each of the inorganic materials of which it was itself composed, and producing each material at a rate that was, on the average, proportional to the amount of it present in the tissue. Although the new tissue was built up from symmetrical inorganic materials, each of its dissymmetrical components was produced in that one only of its optically active forms which was present in the living tissue. There was an *a priori* probability that an optically inactive growing tissue would be, with respect to its optical properties, in a state of unstable equilibrium; from which it followed that if, in the two mirror-image forms, there was the slightest departure from exact equality, this would increase progressively as growth increased. For the purpose of his hypothesis, said Dr. Mills, it was necessary to assume that the first living matter on this planet was a microscopic structure with a minute initial bias towards one optical system or the other. If the principles he had set forth were justified, this state of affairs would eventually give place to the complete optical activity of the molecularly dissymmetric components of all living matter. The development of the organic kingdom from a single germ would provide a simple explanation of the structural relation that appeared to exist between the optically active components of the most diverse forms of life.

Work of the Systematist

Lord Rothschild, president of the Section of Zoology, took for the subject of his opening address "The pioneer work of the systematist." At the time of Linnaeus, he said, when systematics were in their infancy, individual specimens showing marked differences were as a rule diagnosed as representing distinct species, the unit called "species" being looked upon as essentially a constant. The attitude of the systematist had been modified, however, by the evidence that had accumulated of the great range of variability shown by many organisms. The concept of the constant species was replaced by the concept of the flexible species, and the saying that like bred like had to be modified into the statement that a population bred a population with the same extent of variability. In studying the characteristics of each specific unit, said the lecturer, and drawing up diagnoses for purposes of recognition, the systematist collaborated with defensive biology in its task of safeguarding humanity against the ravages of pathogenic and food-destroying organisms. When, for example, the commission investigating bubonic plague in India had decided that the disease was transmitted to human beings through the agency of a particular species of rat-flea, it still found itself unable to explain the very short duration of an outbreak of plague in two cities—Colombo and Madras—where rat-fleas abounded. The puzzle was solved by a systematist (the lecturer's brother) who, having examined flea material collected in the towns mentioned during a period when there was no plague and again during an outbreak, found that the flea ordinarily infesting the rats was not (as the commission had assumed) the plague flea, *X. cheopis*, but *X. astia*, a very similar, but different species, which was then proved by experiments to be an inefficient carrier of the disease. For some reason or another *X. cheopis* was maladapted to the environment at Colombo and Madras, and in these cities the disease was unable to take as strong a hold as elsewhere. It was not, insisted the lecturer, for the help he could extend to applied biology that the systematist undertook his investigations. He was a student of pure science, devoting his time to the discovery of new species, of new connexions between them, and of new facts bearing upon the relation between species and environment. For him the one driving force was the irresistible attraction of the subject itself and the disinterested pursuit of facts within its scope.

Suppression of Noise

In the Section of Engineering Dr. G. W. C. Kaye, superintendent of the physics department at the National Physical Laboratory, read a paper on the suppression of noise. The physics of acoustical measurement, he said, with which the problem of noise suppression was largely bound up, had made great strides with the discovery of exact and easily applied methods based upon the use of the thermionic valve. By present-day electrical methods noises could be analysed into spectra, and their loudness either measured by the microphone or matched aurally against some calibrated standard. The unit of intensity now generally adopted was the decibel, which corresponded approximately to a 25 per cent. increase in acoustic energy, and also approximately to the sensation scale of loudness of the human ear. The auditory range

of loudness embraced about 120 decibels, the level reached in an express train being about 70 to 80, and in a quiet room about 30. The best way of suppressing noise, said Dr. Kaye, was to silence it at its source, but failing this ideal solution a policy of isolation was likely to be more effective than one of absorption. All three expedients had been resorted to, each with partial success, in the modern aeroplane liner, with the result that the noise heard by the passenger, which was formerly intolerable, was now but little louder than he would experience in an ordinary train. Investigations at the National Physical Laboratory had shown that in walls of simple structure sound reduction depended almost solely upon the weight of material per square foot. Unfortunately, the present trend of building materials and structure was towards lightness and thinness, with acoustic results that were painfully apparent to residents in the newer houses. The solution lay in the multiple wall, consisting of two or more separate walls free from cross-ties. Structural discontinuity was the specific remedy for structure-borne noises. When reinforced concrete was the main structural material good sound insulation was so difficult to attain that this material should as far as possible be avoided in house construction.

(To be continued)

THE MUNICIPAL DOCTOR SCHEME IN SASKATCHEWAN AND MANITOBA

AN EXPERIMENT IN MEDICAL ECONOMICS

[FROM A CORRESPONDENT]

After the war some rural districts of Canada, particularly in Saskatchewan, were unable to secure satisfactory medical services. Doctors in these districts found it difficult, or impossible, to make a living, and consequently sought the larger centres or entered special fields of practice. To induce them to remain some municipalities paid bonuses, and out of this the municipal doctor scheme evolved. Under this scheme the municipality levies a tax on property, and with this tax pays the full-time salary of the doctor. Beginning with one Saskatchewan municipality in 1921 the system has extended until now thirty-six in Saskatchewan and five in Manitoba employ municipal physicians.

The rural municipality is a local self-governing area, deriving its powers from the Municipal Act passed by the legislature of the province. An average municipality in Saskatchewan is eighteen miles square and has a population of about 1,800. The average farm contains 400 acres, and on this the tax for medical services would be from $12 to $15 per annum. Salaries paid to municipal physicians range from $3,000 to $5,000 per annum—in both provinces the Municipal Act sets the maximum salary at $5,000 a year. It is stated that no municipality which has adopted the municipal doctor scheme has ever reverted to the former system of private practice.

As an experiment in medical economics the scheme attracted the attention of the Committee on the Costs of Medical Care, which is engaged in a five-year study of the problems relative to that subject within the United States. An investigation was made in 1929 and 1930 by C. Rufus Rorem, to whose report, published by the University of Chicago Press, those desiring further information are directed.

ADVANTAGES OF THE SCHEME

To the farmer, since practically all those coming under the scheme owe their living to agriculture, the advantages are obvious. He knows exactly what the tax will be on his property, and for this tax he receives medical attention, excepting major surgery, for himself and his dependants. He has, therefore, no fear of prolonged illness or accident putting a crushing burden of debt for medical services upon him. In private rural practice the custom is that the doctor charges $1 per mile. Thus a patient living fifteen miles from the doctor's residence would be charged by a private physician $15 for each call in addition to the regular fee; in a maternity case the mileage charges may equal, or even exceed, the fee charged for the confinement. The municipal doctor scheme imposes no extra tax on the patient who lives at some distance from the doctor. It is, in effect, a system of health insurance for the whole community. A patient may consult the doctor at any time; there is, therefore, theoretically at least, no reason for him to disregard minor ailments or to neglect to call in the doctor in the early stages of an illness.

Since no new machinery has to be set up, the expense to the municipality of administering the scheme is very slight. Practically the only expense is the physician's salary, for which he performs the duties of a health officer, including the inspection, vaccination, and immunization of school children. As the tax is levied on property *ad valorem*, the rich, to some extent, bear the burdens of the poor, as in the case of school rates. The poor and the indigent receive adequate medical care, and the municipality saves money, since there is less indiscriminate recourse to hospitals. The municipal doctor has an assured income and no bookkeeping. It is to his interest to keep his patients well; he will, therefore, if wise, put much emphasis on preventive medicine, and thus may be able to check disease in its incipiency. The experience of the Ministries of Health in both provinces is that health programmes are carried out more efficiently where municipal doctors are employed.

ITS DRAWBACKS

The disadvantage to the rural public is that there is no choice of doctor; to the doctor the loss of independence. The doctor is employed by a municipal council consisting of a reeve and six councillors, practically all of whom are farmers. The councillors are elected annually, and consequently must keep on good terms with the electorate. If any dispute arises between doctor and patient the council is likely to side with the latter; in many instances the councillors are men whose education and outlook do not lead them to sympathize with the professional man. The privilege of securing a doctor's services at no cost has at times been abused by patients, especially those living at a distance, and there have been instances of friction between municipal physicians who occasionally invade territory outside their own, and so come into conflict with doctors engaged in private practice.

So long as the scheme was confined to municipalities which had at the time no resident physician or had had much difficulty in securing adequate medical service, the profession as a whole took comparatively little interest in the scheme. When, however, municipalities which for years had had a resident physician voted in favour of a change, trouble arose. In November, 1931, a municipality in Manitoba, which had been served by one resident physician for over sixteen years, voted by a slender majority in favour of the scheme, and the council, also by a narrow majority, voted against the engagement of the resident physician. The Manitoba Medical Association thereupon stepped in to obtain some measure of justice for the resident physician who was thus summarily dispossessed, and to prevent similar injustice in other municipalities.

RECENT LEGISLATION IN MANITOBA

After a conference between officers of the Manitoba Medical Association and of the Union of Manitoba Municipalities, amendments to the Municipal Act were drafted, and these amendments have recently been incorporated into the Municipal Act by the legislature. They provide that there must be a three-fifths majority in order to bring the scheme into effect; that a vote may be taken only once in three years; that, in a municipality where a resident physician has been practising, the electors shall decide whether he is to be appointed municipal doctor; that all contracts must be made on a standard form drawn up by the Minister of Health,

and that each contract must be approved by the Board of Health. The standard contract in Manitoba provides for two weeks' holiday with pay in each year, and an additional two weeks every second year for post-graduate study. A municipal doctor is also entitled to attend the annual meetings of the Manitoba Medical Association and the meetings of his district medical society without deduction from his salary. At least three months' notice must be given by either party before the contract can be terminated.

During the past year a select committee of the Manitoba Legislative Assembly studied the problem of medical services in Manitoba. The report of this committee, recently adopted by the legislature, approves of extension of the municipal doctor scheme throughout rural Manitoba. It must be borne in mind that prairie farmers have had great difficulty during the last two years in meeting expenditure. The return from farm products has been reduced by two-thirds, and on this account it seems probable that municipalities in the prairie provinces in increasing numbers will take up this scheme. It is evident that physicians in general will be obliged to pay more attention to problems of medical economics, and that the profession, as a whole, will require to be well organized. Medical opinion inclines to the view that there is a tendency on the part of municipal councils to underpay municipal physicians, that no maximum salary should be fixed, and that physicians should be able to make the best possible contract they can. It is also evident that the human element is the most important factor in the working of the scheme, and that, in the last analysis, it is the personality of the municipal doctor that counts.

Australia

[FROM OUR CORRESPONDENT IN MELBOURNE]

Public Hospital Report Forms

Complaints are frequently heard that there is insufficient liaison between the staffs of public hospitals and the private practitioner who sends patients for treatment, with the result that the practitioner tends to lose touch with his patient, and on the latter's return home often does not know what diagnosis has been made and what treatment instituted. In 1921 this state of affairs was pointed out to the council of the Victorian Branch of the British Medical Association, and also outlined in a letter to the *Medical Journal of Australia*. At the request of the council your correspondent suggested a hospital report form, and this was submitted to, and approved by, the honorary medical staffs of all metropolitan hospitals in Melbourne, and was adopted by the Branch council. During the following six years, when your correspondent had part-time medical charge of a Government institution handling 2,000 children a year, approximately 1,500 children were sent to public hospitals for treatment accompanied by this hospital report form. The number of cases in which the resident or honorary medical staff of the hospital concerned failed to return a full and satisfactory report of the patient's condition and treatment was so few as to be negligible, certainly less than ten in five and a half years. These reports proved of immense value. A number of private practitioners in Victoria have also made use of the forms with satisfaction, but they have not come into general use. The figures quoted prove that hospital staffs welcome the idea and carry out the system faithfully, although they are responsible for the greater part of the additional work involved, but the private practitioner, who has little additional trouble, and who reaps the greatest benefit, has failed in most cases to appreciate the value of the idea or to make systematic use of it. It is hard to understand this phenomenon ; either the busy general practitioner cannot find time to fill in a stereotyped form giving brief details of the condition of his patient, or he does not care sufficiently for the patient's welfare to wish to know of his condition when discharged from hospital. If this is the explanation, it is a sad commentary on the state of medical practice, and would seem to indicate the necessity for education in co-operation and team work which should be facilitated by the universal use of this hospital form or something on similar lines.

Presentation from the Royal College of Surgeons of England

At the annual conference of the Royal Australasian College of Surgeons, held in the University of Melbourne, the first business was the presentation of the great mace given to the College by the Council of the Royal College of Surgeons of England. Opening the conference, the Lieutenant-Governor, Sir William Irvine, extended a very cordial welcome to the distinguished visitor, Mr. C. H. Fagge, formerly senior vice-president of the parent college, who had travelled from England for the purpose of making the presentation and performing a ceremony of great significance and moment to the whole profession. The mace was more than a mere token of good will and fellowship, more even than an extremely beautiful gift from the most ancient and most renowned institution of surgery in the world ; it might be described as symbolic of the sharing of a great heritage: a symbolic assumption of a great responsibility. The President of the Royal Australasian College of Surgeons, Sir Henry Newland, introducing Mr. Fagge, said that a more suitable emissary could not have been chosen. Mr. Fagge and his forebears had had a long and distinguished association with the profession of surgery ; he was a British surgeon who had achieved distinction. A message from Lord Moynihan was then read, and Mr. Fagge formally presented the mace. Explaining the significance of its design, Mr. Fagge said that in early days a mace was a weapon of offence, but in the twelfth century ceremonial maces, originally intended for the protection of the King's person, came into use. At first the flanged end—that is, the head of a war mace—was borne uppermost, and the small button bearing the Royal Arms in the base, but by the fifteenth century the position was reversed. The end bearing the Royal Arms had gradually eclipsed the " heel " as the beauty and elaboration of its decoration increased. In designing the mace for the Royal Australasian College of Surgeons, Omar Ramsden had followed the general form and proportions of that of the Royal College of Surgeons of England, which was executed by His Majesty's goldsmiths ; of necessity the ornaments had been altered and appropriate emblems had been introduced. By express permission of the King the finial was formed by the Royal orb and cross, supported by four arms or buttresses suggesting the shape of a monarchial crown, and on them was a border of briar symbolizing the thorny path which led to greatness. The four panels round the head bore the arms of the Commonwealth of Australia, the Dominion of New Zealand, the Royal Australasian College of Surgeons, and the Royal College of Surgeons of England, between which were oak decorations emblematical of the permanence of these institutions. Beneath the head, which was supported by eight British lions, was a wavy strip to symbolize the separating seas. The universal decorations were the rose of England, the seven-pointed star and wattle of Australia, and the fern of New Zealand. The staff bore the names of members of the Council of the Royal College of Surgeons of England in the year 1930–1. Sir Henry Newland said that, as president of the Royal Australasian College of Surgeons, he accepted the mace with pride and gratitude ; the generous motives and fraternal sentiments which prompted the gift had touched their hearts. The younger college, looking beyond the seas for inspiration, found it in the ideals and example of the Royal College of Surgeons of England.

After the ceremony a number of new Fellows were admitted to the College and Mr. Fagge to an honorary fellowship. The first George Adlington Syme oration was then delivered by Mr. Fagge ; it consisted of an appreciation of the life and work of the late Sir George Syme, the first president of the Australasian College, and a discussion of his achievements, character, and influence. In concluding his address, Mr. Fagge said that among his professional brethren in Australia the claim of Sir George Syme to honour was that of the medical statesman of the generation—wise in counsel, prudent in conduct, tactful in method. On February 18th, at a special meeting of the council of the University of Melbourne, the degree of Doctor of Medicine by Special Grace was conferred on Mr. Fagge.

Presentation of A.A.M.C. Colours

On December 16th, 1931, in the Medical Society's Hall, Melbourne, the King's Colour, which was awarded to the Australian Army Medical Corps in recognition of its services during the South African campaign of 1899, and previously kept at military headquarters in New South Wales, was presented to the Victorian Branch of the British Medical Association for temporary care and safe keeping. The presentation was made by the Director-General of Medical Services, Major-General George Barber, in the presence of a large gathering of officers of the A.A.M.C. and their wives and friends, members of the council of the Victorian Branch of the British Medical Association, and representatives of the medical and allied branches of the Australian Military Forces. Before handing over the colours, Colonel Downes gave a brief address on their award and consecration, their general significance, and their history, dating back to remote antiquity. They could be traced, he said, from India over 5,000 years ago to the vexilla of the Roman legions originally fashioned in metal, which gave place to cloth, silk, or damask just before the Christian era. Colours or standards had been used to indicate rallying points on the field of battle, but with changes in the weapons of war had come to be symbols of sentimental and patriotic feeling. Their last appearance in a European war had been in the Crimea, where a large proportion of the colour bearers had been killed in action. Their last appearance in the British army on the battlefield had been in the Zulu war of 1879, but both armies had carried them in the Russo-Japanese war. Since then colours had not been carried into battle. As far as could be ascertained the granting of the King's Colour to the Australian Army Medical Corps was the only known instance in which a medical service had been so signally honoured. It was intended that they should be held in custody in the cathedral at Canberra.

The following is a brief extract from the summary of the work of the Comité Permanent de l'Office International d'Hygiène Publique described at the extraordinary session in April and May this year. Information concerning anti-plague vaccination shows that the results have been more favourable in British India than in other countries. Whether this is to be explained by the superiority of the Haffkine vaccine is still regarded as an open question, but one which must be investigated experimentally. During the epidemic of cholera in Iraq in 1931 a large number of healthy carriers of cholera vibrios were discovered among travellers entering Syria. Three cases of encephalitis following anti-typhoid vaccination are described from Rumania ; hemiplegia, somnolence, and absence of temperature were prominent. In one fatal case meningeal hyperaemia was found. Transmission of the infection to *Macacus cynomolgus* was successful and proved rapidly fatal. Placental blood, fractionally sterilized, has been used with success in Portugal for the seroprophylaxis of measles in infants.

Ireland

Maternity and Child Welfare in Belfast

The superintendent medical officer of health, Dr. C. S. Thomson, in a report to the Maternity and Child Welfare Committee of Belfast Corporation, stated that of the 679 deaths reviewed 266 were of infants under 1 month. The chief causes of death were prematurity, debility, bronchitis, and pneumonia, and this high infant mortality rate was largely due, in the first place, to poverty. The fact that 266 deaths occurred in the first seven months of life pointed to the under-nourished mother, while in the case of infants from 1 to 12 months, the want of proper feeding and extreme poverty were clearly indicated. The estimate for the year ending March 31st, 1933, for wet milk and dried milk (food) was £3,500. This amount at the present time was not sufficient for the needs of necessitous expectant and nursing mothers, and infants attending their clinics and centres. Very large numbers of cases had to be taken off the milk or food much earlier than they should be in order that new cases should receive their share, and as the parents were in such poverty they could not afford to buy milk or food for the infants. The above figures and remarks suggested that the milk fund for infants and nursing mothers should be considerably increased, and that a soup kitchen or something similar should be provided for necessitous expectant mothers. If something on the above lines were not done the infant mortality rate would be very high this year, and those infants who survived might show the results afterwards. In a very large number of cases the mothers did not attend any place for ante-natal supervision, but inquiries in all these cases proved that in many the people were poor. One thousand and one children, it was stated, were receiving free milk under the corporation's scheme. The committee decided to bring to the notice of the Education Committee, for immediate investigation, the subject of tuberculous children attending public elementary schools.

Appointment of Temporary Medical Officers

In a letter to the Louth Board of Health the Secretary of the Department of Local Government and Public Health stated that he was directed by the Minister for Local Government and Public Health to send a copy of a letter received from Dr. Daly, medical officer of the Dundalk No. 2 dispensary district, relative to the non-acceptance by the Board of the medical officer, Dr. McEntagart, nominated by him to discharge his duties during his absence on vacation. He was to state that the arrangement proposed by Dr. Daly appeared to be suitable and convenient for the care of the sick poor. The Minister considered that unless there were special and adequate reasons, the Board of Health and Public Assistance should appoint the practitioner nominated by the medical officer, in accordance with Article 30 of the dispensary regulations, as there were obvious reasons why a medical officer might prefer to entrust his duties and private practice to a colleague of his own choice. The period during which the temporary medical officer would be responsible for the district should, however, be definitely stated. After a prolonged discussion the Board reluctantly decided, in view of the Minister's letter, to approve of the appointment of the officers nominated by each dispensary medical officer. Ten medical officers were granted four weeks' leave of absence at £6 6s. a week. The dispensary medical officers, as in other areas, should endeavour to support the Department by nominating suitable substitutes, as, when a temporary medical officer living ten miles or so away was nominated, the Department obviously could not question the right of the Board of Health if it refused the nomination.

Appointment of Assistant M.O.H.'s in County Cork

At a meeting of the Cork County Council a letter was read from the Minister for Local Government in regard to the refusal of the council, on the grounds of economy, to co-operate with the Board of Public Health in filling the position of assistant county medical officer of health, school medical officer, and clinical tuberculosis officer, rendered vacant by the resignation of Dr. J. C. Troy. It pointed out that, while the Minister shared the views of the council as to the necessity for reducing expenditure, the curtailment of essential public health services would not result in a real saving. The council decided to comply with the request of the Minister, and to appoint three assistant medical officers of health.

England and Wales

Cerebro-spinal Fever in England and Wales

In a communication to the Office Internationale d'Hygiène Publique, published in the July *Bulletin*, Sir George Buchanan surveys the incidence of cerebro-spinal fever in England and Wales during the last ten years, with special reference to the period 1929–32. He points out that in the normal inter-epidemic periods such as 1922–8 the mild cases were rarely diagnosed and notified, so that the cases notified were almost exclusively fatal. On the other hand, when there is a local outbreak of cerebro-spinal fever, as was observed in 1930–2 in some English counties, the practitioners soon become familiar with the early symptoms, and a large number of the cases notified recover, whether spontaneously or as the result of treatment. The best proof of the increased incidence of the disease is to be found in the increased fatality rate since 1929, when the number (588 deaths) exceeded that notified in England since 1915. The greatest increase was found in the West Riding of Yorkshire, as is shown by the fact that out of the 2,157 cases notified in 1931 885 occurred in this district. Although the period 1930–2 was one in which there had been an increase of influenza, the regions showing an increased incidence of cerebro-spinal fever have not shown a special or simultaneous increase of influenza.

A Welsh Surgeon-Archaeologist

In the introduction to his pamphlet *Key of All Wales* Sir John Lynn-Thomas writes: "Ten years ago, Llwyndyrys Mound, a prominent ancient landmark, came under my control as an enigma. *Barrow* to historians, *Tumulus* to ordnance surveyors, but what is it? whispered Old Curiosity." The official local archaeologists pooh-poohed Sir John's speculations, but he was not easily to be discouraged, and persisted in his researches, not only into the mound, but into the geology, prehistory, and history of the neighbourhood, with results many of which are here described. Llwyndyrys is situated on the River Teify, four miles above Cardigan, which place is now close to the head of the present estuary of that river. From as far back as memory and tradition go the estuary has been used by invaders and defenders of the Welsh coast and of the adjacent hinterland, and in 1187 Rees ap Tudor, with an army from Ireland, landed and successfully engaged the usurping leaders and defeated them at the battle of Llechryd. Sir John Lynn-Thomas is at pains to show that this battle occurred at and around Llwyndyrys. Moreover, he brings forward evidence showing that the Mound is not an artefact, but consists of solid rock, and was used in prehistoric times as part of a great camp or fortress. He and others have found in the neighbourhood a wealth of Neolithic implements and weapons, some of which are represented in reproductions of photographs. The inscribed stones, which he also exhibits, are still subjects of discussion among archaeologists. Many other interesting questions are raised by Sir John, including some as to the races of men now inhabiting the estuary, to whom he applies the collective name of "Estuarian." If we are to accept the suggestion of the frontispiece he would include himself under this title. But we fail to find any evidence of "dysharmony" or assymmetry in that representation of his genial physiognomy. This pamphlet, with its wealth of illustrations, is really a collection of copious but rather disjointed notes, and might well be expanded into a much larger volume.

National Sanatorium Association

During the year ended December 31st, 1931, structural alterations were effected at the National Sanatorium, Benenden, Kent, which raised the number of beds available for use from 142 to 147. In his annual report the chairman of the association mentions that the charge for accommodation has been reduced by 1s. a week, and that in spite of the bad season of 1931 the loss on the farm was reduced to only £36. He adds that it is extremely doubtful whether, without the farm, it would be possible to provide so excellent a service, or to secure such satisfactory general results as the association is now able to do. In the medical section of the report, Dr. H. Spurrier, medical superintendent, states that very definite improvement has attended continuation of the therapeutic lines adopted in previous years. The induction of artificial pneumothorax and the administration of sanocrysin have been employed in a larger number of cases with most satisfactory results. Again he has to complain of the high percentage of more advanced cases in the sanatorium—many valuable months have been wasted before admission by patients continuing at work too long before obtaining medical advice. The standard of improvement during the year under review was, nevertheless, higher than previously, 203 cases out of a total of 258 having been discharged much improved.

Correspondence

BLOOD TRANSFUSION

SIR,—I was greatly surprised to read Mr. Geoffrey Keynes's letter on transfusion in your issue of August 27th. He rightly condemns cutting down upon the vessel, and adds that the London Blood Transfusion Service does not permit its donors to have this operation performed. He then describes his method of transfusion, which is nothing more than a modification of the operation he condemns. Transfusion is a form of treatment of such enormous value that every practitioner should be able to perform it, and it is therefore most undesirable to recommend such a needlessly complicated method as that advocated by Mr. Keynes.

My colleagues at this clinic have performed transfusion over a hundred times in the last few years, and in only one instance has there been the slightest difficulty in obtaining blood from the donor by the simple method of introducing the needle direct into the vein without any preliminary injection of an anaesthetic and without the incision advised by Mr. Keynes, and in no instance has the donor complained of pain or of any subsequent disability. This is also the method with which every house-officer at Guy's Hospital is familiar, and which has been used by my house-physicians for the 140 transfusions which a patient with aplastic anaemia has received during the last five years, thus making it possible for him to

enjoy life and earn his living. It is to be hoped that Mr. Keynes's film will be scrapped without delay.—I am, etc.,

New Lodge Clinic, Sept. 1st. ARTHUR F. HURST.

SIR,—I am sure that the method of obtaining blood from a donor which Mr. Geoffrey Keynes describes in his letter in the *Journal* of August 27th would, when performed by him, give perfect results. It is not, however, in my opinion a method which should be used on volunteer donors of transfusion services. In a circular published by the London Blood Transfusion Service for distribution to prospective donors the following statement appears:

"The needle method of extraction is alone to be used. Opening the vein, cutting down upon it, or levering it up, is forbidden, and donors are instructed to refuse to serve unless this condition is observed."

The technique advocated by Mr. Keynes, if it does not actually contravene this regulation, sails very near the wind. To the donor, at least, the regulation implies that no knife will be used and no cut made. As medical secretary of the Merseyside Blood Transfusion Service I have referred to me all complaints in reference to the treatment of donors, and it has been my experience that where Mr. Keynes's technique has been used the "tiny nick" has been magnified by the donor, or more usually by his relatives, employers, or friends, into a large incision—so seriously did these complaints affect recruiting of volunteers that it was found necessary to prohibit entirely the use of a knife. Since this regulation has come into force I am glad to say that I have received no more complaints.

When I stated that a "considerable amount of force" is sometimes necessary to push a large-bore needle through the skin, I used the term only in a comparative sense. If the technique I suggested is employed, the donor is quite unconscious of any discomfort, and there is no risk of injury to the vein and extravasation of blood.

Surgically I have nothing but praise for Mr. Keynes's technique; but I object to it because in the hands of the inexperienced his "tiny nick" may easily become nearer 2 cm. than 2 mm., because it infringes the spirit of the conditions of the transfusion services and its general use would have an adverse effect on the recruitment of volunteers, and because in the Merseyside area it would result in the refusal of the Service to supply any more donors to a surgeon who employed it.—I am, etc.,

Liverpool, Aug. 27th. J. BAGOT OLDHAM, F.R.C.S.

SIR,—In recent correspondence in the *Journal* attention has been drawn to the importance of avoiding exposure of the veins of blood donors, but it seems to me at least equally important that the same consideration should be extended to the recipient, who is frequently suffering from shock and is apt to be apprehensive.

Keynes's apparatus and the old gravity method have been advocated, but anyone who has used the technique described by Colebrook and Storer (*Lancet*, 1923, ii, 1394) will probably agree that it is superior to either of these methods. Colebrook's technique was suggested for use in immuno-transfusion, but there is no reason why it should be restricted to this limited field. The open funnel method has obvious disadvantages, while in Keynes's method it is sometimes difficult to control the pressure in the bottle, and the cork is apt to "jump." The transfusion is often held up by blockage of the needle. As Mr. Moore admits, it is frequently necessary to expose the vein.

Using Colebrook and Storer's technique in a series of some sixty-five transfusions, I have never had to expose the donor's vein, and on only six occasions have I exposed that of the recipient. Defibrinated blood, which is used in this method, has the following advantages over citrated blood: (1) it has been shown that immune bodies are destroyed by citrate; (2) it is possible that the large quantity of citrate has a toxic effect; (3) in the citrate method 160 c.cm. of citrate solution are used, and, as in some cases it is wise to give only a limited volume of fluid, it follows that one can inject 160 c.cm. less blood; (4) defibrinated blood contains active fibrin ferment, which is surely an advantage in cases of haemorrhage.

In my experience defibrinated blood has proved effective in haemorrhage, in pernicious anaemia, sprue, various secondary anaemias, and in infective conditions. The collection of the blood presents no difficulty if the technique is properly carried out, but I would stress the importance of obtaining a good flow right at the start. A rapid succession of drops is not enough. The bottle must be held low so as to give a good fall on the tube. If these precautions are observed, clotting never takes place. To inject the blood into the recipient I have made one modification of Colebrook and Storer's method. They use a 20 c.cm. syringe and two two-way taps, but the many joints involved are apt to leak. I have therefore substituted a rotanda three-way syringe. The needle I use for the recipient is a platino-iridium intravenous needle. It is convenient to have a Harrison's tap attached. The method has worked smoothly in the most difficult cases, and I venture to think it worthy of more universal adoption.—I am, etc.,

Bournemouth, Aug. 30th. R. VAUGHAN FACEY.

POST-PROSTATECTOMY EPIDIDYMITIS

SIR,—In the course of the discussion on prostatectomy in the Section of Surgery at the Centenary Meeting, the question of dividing the vasa deferentia as a precaution against post-operative epididymitis was freely discussed. Three speakers made reference to a paper I published ten years ago (*Lancet*, 1922, i, 321) which dealt fully with both the pre-operative and the post-operative conditions of the epididymes in fifty cases. As there was some difference of opinion as to certain of the facts set out in that paper, perhaps you will allow me some of your valuable space in which to make the matter clear.

In short, my observations showed that in 82 per cent. of the cases I examined, changes were palpable in the epididymes post-operatively which could not be found before operation. It is perfectly useless for anybody to try to express a competent opinion on the relative incidence of post-operative epididymitis unless he makes careful notes of the condition of the epididymes as found pre-operatively, so that the post-operative condition can be compared. This is especially necessary because a certain proportion of patients present themselves for operation with evidence of pre-existing epididymitis. The same painstaking palpation of the scrotal contents during the convalescence is just as essential, for the very good reason that in the majority of cases the inflammatory change is of an indolent type, causes no, or only insignificant, subjective symptoms, and thus escapes notice altogether unless a search is made. Every experienced general practitioner will recall at least one patient—a successful case from the point of view of the prostatectomy—who develops acute or subacute epididymo-orchitis weeks, months, or even years after the operation. Such a termination must exist as a constant danger to every case in which the epididymes have been infected as a result of the prostatectomy.

For the past ten years I have practised bilateral division of the vasa deferentia as a preliminary to prostatectomy in all cases, except in those younger patients who prefer to preserve what faint prospects there are of post-operative fertility. This experience enables me to affirm what an excellent precaution it is against the complication forming the subject of this letter.—I am, etc.,

London, W.1, Aug. 26th. H. P. WINSBURY-WHITE.

PATHOGENESIS OF IDIOPATHIC HYDROCELE

SIR,—Assuming that hydrocele is always preceded by prostatitis and vesiculitis, as suggested by the correspondence in the *Journal* of August 13th and 27th, I fail to understand how infection of the lymphatics from the anus and the rectum can be responsible for the initial cause. The anatomical distribution of the lymphatics does not favour this theory, whereas direct infection of the lumbar glands by the pelvic colon is especially possible, inasmuch as constipation predisposes to visceroptosis of this part, which, acting as a cesspool, would readily cause them to be infected. The tunica vaginalis drains through the superficial group of lymphatics, and the testis and epididymis through the deep lymphatics into the lumbar glands.

The suggestion by the second correspondent (August 27th) that the condition is due to a generalized infection of the whole genital system, seems incorrect, since if it were a fact urinary symptoms would be present in every case of chronic hydrocele—which is not the case. In the cases referred to in my article in the *Journal* on August 6th there were no urinary symptoms and no signs of prostatitis or vesiculitis; nor have I noticed any such symptoms in my hospital "idiopathic" chronic hydrocele cases in England or abroad. I have always regarded prostatitis, vesiculitis, and epididymitis occurring concurrently with hydrocele as being due to tuberculosis or gonorrhoea, any pyogenic organisms present being secondary.

Efficient treatment of the cause, if discoverable, attacking every source, should make open operation unnecessary. By tapping the hydrocele, and using the injection method as suggested in my article, much time will be saved, with the minimum discomfort to the patient, which, after all, is the main consideration.—I am, etc.,

London, W.1, Aug. 27th. MORTON WHITBY.

INJECTION TREATMENT OF INGUINAL HERNIA

SIR,—Many of us who try to cure inguinal hernia by open operation have met with cases in which a prolonged search has preceded the identification of the sac, despite the direct use of both touch and sight, and the advantage of a free division of tissues.

After such an experience one can only regard with admiration the skill, deftness, delicacy of touch, and precise anatomical knowledge that enables anyone to thrust a needle through skin, subcutaneous, fascial, aponeurotic, and muscular coverings, with its point reach, locate, identify, and enter, without transfixing it, the potential cavity of an empty and collapsed hernial sac, and place there an irritating fluid capable of exciting obliterative inflammation, while securing the patient against the risk of any of that fluid reaching to the general peritoneal cavity, and there setting up adhesive peritonitis.—I am, etc.,

London, W.C.1, Aug. 30th. R. K. HOWAT.

THE FUTURE OF THERAPEUTICS

SIR,—Professor Gunn would have us believe that this era is to be an era of therapeutics, that the future of pharmacology depends on more laboratories and further specialized hospitals, libraries, and research workers. The side-tracks which first beguiled investigators fifty years ago are so well worn that they resemble main roads. The thoroughfare "rational therapeutics" ends in a mirage. Pharmacology is still based on a sceptical empiricism. The bacterium as a single cause of disease is an avenue only recently regretfully abandoned. Koch's bacillus and Eberth's bacillus have not materially altered the drug treatment of phthisis and typhoid, and the triumphal archway with motto "Therapia magna sterilans" begins to look a little battered.

Laboratories and simplification go together, but the zeal for eliminating complicating factors often loses the baby as well as the bath water. Concentration on the reaction between the drug and germ has involved the neglect of the defence mechanisms of the host; elimination of subjective sensations in man has resulted in loss of the complete drug syndrome, with the introduction of an error in comparing the objective pathology of animals, whose metabolism often differs considerably from the human. The idea of chemical structure and drug action has been greatly over-elaborated; on this hypothesis thousands of drugs have been synthesized, but barely a score have proved generally useful.

Professor Gunn admits that "direct observation of the effects of drugs on disease in man" is the source of more than half of our materia medica; and "every administration of a drug may be regarded as an experiment." Surely it is time for the huntsman to call off his hounds from the trails of the various red herrings and bring them back to the original covert. Fresh casts should be made in the direction of those "insignificant side-actions"; into alterations of subjective sensations; and into the particular defence mechanism stimulated by the drug. Back to the bedside for these studies. The collective investigations which the British Medical Association has already instituted can serve as models for further research in practical pharmacology by general practitioners.—I am, etc.,

Bristol, Aug. 31st. FRANK BODMAN, M.B., M.R.C.S.

MATERNAL MORTALITY AND MORBIDITY

SIR,—I was much interested to read the report on maternal mortality and morbidity recently issued by the Ministry of Health (*British Medical Journal*, August 13th, p. 327). I noted that the authors of this report strongly recommended a great many precautions—valuable in so far that they might easily be introduced into general practice by the exercise of a little forethought on the part of the practitioners—for the prevention of puerperal sepsis. They also recommend a great many other suggestions for the care of the pregnant woman, which could also be carried out quite easily, and I feel strongly that the report should be in the hands of every practitioner in Great Britain. The great majority of the suggestions in the report were pointed out to us in our medical schools, but as the majority of us only saw them enforced in hospitals we have failed, I maintain, to realize how fully asepsis can be introduced into domiciliary practice. Again, puerperal sepsis is so relatively rare in practice, and so many women have perfectly normal confinements under conditions which are quite the reverse of the ideals at which we should all aim, that despite themselves a large proportion—I might almost say the majority—of general practitioners fall into slipshod methods.

This report was compiled primarily for the general practitioners of Great Britain, and for them alone, but I contend it is not reaching them. It caused a slight sensation in the lay press when published, and the daily papers all published verbatim the more "dramatic" parts of it; but this is already a month ago, and the report looks like being forgotten and neglected unless steps are taken to bring it to the notice and consideration of the general practitioners.

But for the size of the report I would suggest that a copy of it be sent gratis to every practitioner on the *Register*, but I do not think this is a very practical suggestion, as, with the best will in the world, few men in practice have the time to read so lengthy a report. I would suggest, however, that the parts of the report which are concerned with the suggestions for the care of the woman in pregnancy and labour be condensed into a pamphlet and sent round to every doctor on the *Register*, with a letter requesting him to read it and to carry out these suggestions in so far as lies in his power. This would obviate the necessity of his having to pick out the essential parts of the report for himself; and if it were presented to him in this manner there is a big possibility that it would be widely read and its suggestions put into practice, otherwise the valuable work of those who compiled it is likely to be lost, with its message having reached only a mere fraction of the doctors for whom it was intended.—I am, etc.,

Balham, S.W.12, Aug. 27th. JULIUS HORWICH, M.D.

PUERPERAL SEPTICAEMIA AND THE MIDWIFE

SIR,—I recently read in a daily newspaper that a medical officer of health had stated that while formerly the death rate from puerperal septicaemia was 6 per 1,000, it was now 4 per 1,000, and that the cause of puerperal septicaemia, according to his researches, was due to streptococcal infection in the noses and throats of the nurses and medical men in attendance.

During forty years of practice I have never lost a case from puerperal septicaemia, and may be considered lucky, though probably it may be a coincidence that the majority of my nurses were over middle age. Professor A. R. Simpson and Dr. Milne Murray both stressed a point in their lectures which I have rarely seen mentioned in treatises on the subject, and I presume that neither of these famous obstetricians would have laid such emphasis upon it unless he had had practical reasons. The former said: "No nurse during her menses ought to attend a parturient woman." The latter was even more dogmatic in his warning: "A nurse, during her menstrual period, constitutes herself a grave and potential danger to the lying-in woman." Here is a fine field for investigation among medical officers of health and bacteriologists!—I am, etc.,

Dumfries, Aug. 30th. J. D. ROBSON.

ANAESTHESIA IN LABOUR

SIR,—I read with consternation the various official dicta which appear from time to time about anaesthesia in labour. In 1847 Sir J. Y. Simpson made his momentous discovery of the anaesthetic properties of chloroform, but I fear that the story has been forgotten. What prompted him to search for an anaesthetic? He was not a surgeon, but an obstetrician, and as such was much moved by the desire to alleviate the sufferings of women in labour. He not only made his discovery, but overcame severe opposition to it and established it in the face of much obloquy.

Since that time the practical results of his work have not progressed one foot, and indeed the recent report of the Departmental Committee on Maternal Morbidity and Mortality that it "would regret a general demand for anaesthesia" is not only disgraceful to a body of professional men whose palpable duty is to relieve pain, but is a complete apostasy of the life and work of Simpson. Fortunately the general practitioner is not yet overcome by Departmental Committees, and he continues to do his best for his cases; but it is time to promulgate some official counterblast to this heresy.

I recently attended a public meeting in Glasgow where the question of a national maternity service was discussed, and it was sufficiently clear that it is the object of the present medical governors of this country to do all in their power to replace doctors by midwives. What does this mean? To me it means as clearly as possible that the working-class women of this country will be condemned to suffer labour without any kind of relief whatever. It does not mean that the better classes will be deprived of this benefit, and, although distinguished professors of obstetrics condemn anaesthesia as an unnecessary addition to the hazards of childbirth, I have yet to meet that hardy obstetrician who could withstand the entreaties of his patient for relief when the fee was fifty guineas.

What is the reason for this official atavism? Puerperal sepsis is the secret. For some reason or other the public health authorities entertain the idea that this condition is preventable and can be eradicated. To this end nothing is spared, and the most fantastic suggestions and extravagances are freely entertained.

In 1842 a Mr. Ward amputated a thigh painlessly under mesmeric trance. He read a paper thereon to the Royal Medical and Chirurgical Society. One member thereupon proposed that no account of such a paper having been read be entered in the minutes of the society, and he further asserted "that if the history of the man experiencing no agony during the operation were true, the fact was unworthy of their consideration, because pain was a wise provision of Nature, and patients ought to suffer pain while their surgeons were operating; they were all the better for it and recovered better." History, it is said, repeats itself.

As for myself, I shall continue to use whatever anaesthetic presents itself. At the moment I use morphine and hyoscine, followed by chloroform, in a dosage and manner a considerable experience has shown to be useful. I have done some 350 cases by this method, and have had nothing but excellent results. Most of my patients remember nothing about their labour for the last four hours or thereabouts, and are pleasantly surprised that their children are born. I see no reason why some such method could not be taught to midwives.

The present regrettable viewpoint is the result of an overweening confidence in the powers of the rational mind. The question of the relief of pain is not a matter of thought, but of feeling, and it is to the compassion of the profession that women—our own sisters and mothers—should appeal.—I am, etc.,

Glasgow, Aug. 29th. THOMAS ROBERTSON.

PERSISTENT PRIAPISM

SIR,—The case described by Messrs. Forrest and Graetz in the *Journal* of August 13th (p. 295) seems to be an example of long-protracted priapism due to an organic lesion of some kind. An apparently healthy man aged 49 years suddenly developed priapism, which persisted unaltered for forty-nine days and nights; then it gradually commenced to subside. The causative lesion doubtless varies in different cases, but what has specially interested me is the occasional connexion with myelosis (leukaemic or aleukaemic myelosis), as that association may possibly

be compared to the relation of myelosis with apoplectiform Ménière's symptoms (Weber, F. P., *Medico-Chir. Trans.*, 1900, lxxxiii, 185) and spontaneous massive haematoma (Weber, F. P., *Proc. Roy. Soc. Med.*, Clinical Section, 1920–1, xiv, 16).

The first case of persistent priapism that I saw was in a man aged 42 years, when I was house-physician at St. Bartholomew's Hospital for Sir Dyce Duckworth, who described it in the *Transactions of the Clinical Society of London* (1892, xxv, 97). In that case the priapism lasted fully three weeks, and was definitely associated with gout. The second case was at the German Hospital in a man aged 46 years (Weber, F. P., *Edin. Med. Journ.*, 1898, New Series, iv, 267). The priapism began to subside after twenty-three days. In that case there was a probable history of syphilis twelve years previously.

In 1909, with my surgical colleague E. Michels, I saw a man aged 33 years with obvious myeloid leukaemia. The presence of the leukaemia had first been recognized during the previous year, *after* an attack of prolonged priapism, which left loss of erectile power when it subsided. In some of the other published cases leukaemia was not diagnosed until after an attack of prolonged priapism. In the case of a man aged 23 years (Vorster's first case, quoted by C. Goebel, *Mitteil. a. d. Grenzgeb. d. Med. u. Chir.*, 1904, xiii, 581) the blood examination at the time of the priapism was said to be negative, though leukaemia showed itself afterwards. In a case reported by H. Liniger (*Monatschr. f. Unfallheilk.*, 1912, xix, 51) the blood examination was also said to have showed nothing definite at the period of the priapism (November, 1910), though afterwards (March, 1911) it showed typical myeloid leukaemia.

In spite of the relative rarity of persistent priapism the literature on the subject is very extensive, and the following are only a few references regarding its association with leukaemia: G. L. Peabody (1880), A. H. Ward (1897), C. Goebel (1904, with references to previous literature), W. M. Stevens (1905), V. Blum (1906), W. Kunst (1907), Della Favera (1908), A. v. Winiwarter (1910), Warthin (1910), H. Liniger (1912), Völsch (1914), G. W. Theobald (1922), P. Williams (1924), Moure and Leibovici (1925), Brown and Doig (1927).

I was interested to read in the *Journal* of August 20th (p. 385) that Dr. C. Davies-Jones suspected that Messrs. Forrest and Graetz's case of priapism might have a "Freudian" aspect and should be referred for psychological treatment, for I do not think that any condition could be more obviously due to organic disease of some kind, though in this case, as in many others, the nature and position of the lesion may be uncertain. There can, however, be little doubt that exhaustive psycho-analytical investigation would reveal something of psychological interest that might be mistaken for "evidence." The thumb press used to coax out a confession of some kind almost whenever it was employed, and the giant in the children's tale of "Jack the Giant-killer" had no difficulty in squeezing moisture out of stones. Needless to say, in all cases of the kind psychological treatment would ultimately be followed by the subsidence of the priapism and would probably not render the leukaemia, gout, or local trauma (for example, some slight traumatism connected with the last erection), or any other causative condition any worse.—I am, etc.,

London, W., Aug. 23rd. F. PARKES WEBER.

SIR,—We were interested in the suggestion of Dr. Davies-Jones (August 20th) that our case of priapism might have a psychological cause. While admitting, however, that our knowledge of the workings of the mind is sadly lacking, we think the fact that the priapism lasted fifty days and was unaffected by deep anaesthesia tends to rule out a psychological cause and to support a theory mentioned by Riches (*Journ. Urol.*, 1930, ii) that the cause is a thrombosis of the veins draining the corpora cavernosa. Our patient was, moreover, quite a sane, placid, and contented individual, in no way suggesting other than an organic basis for the condition.—We are, etc.,

F. P. FORREST.
Exeter, Aug. 21st. G. H. A. GRAETZ.

COMPLICATIONS OF HOOKWORM DISEASE

SIR,—Two conditions, apparently resulting from hookworm infection, have occurred in my practice with sufficient frequency to merit attention, though they are not usually recorded in the textbooks. The one condition is a polyarthritis with high fever and a general resemblance to acute rheumatism. The other is a tendency to haemorrhage from the smaller arteries and capillaries.

Of the first condition a typical case was that of a half-caste girl, 19 years of age, whose sudden onset of fever, pains, and polyarthritis suggested rheumatic fever or gonorrhoeal rheumatism. Sweating was not pronounced, the condition did not improve with salicylates, and there was no evidence of gonorrhoea. Resolution of all symptoms suggestive of rheumatic fever promptly followed the expulsion of the hookworms with which she was heavily infected.

During the last eight years I have met the condition perhaps twice a year. In Fiji acute rheumatism is not uncommon. Chorea is, I think, rare. The only three cases of chorea seen by me in the last two years have been severely infected with hookworm, although hookworm infection is not heavy in this district. I surmise, therefore, that marked hookworm infection is a potent predisposing cause of chorea. It appears also that heavy hookworm infection can cause a condition closely resembling rheumatic fever.

The second condition, the tendency to undue haemorrhage from small arteries and capillaries, has seemed to me of great importance in some surgical, gynaecological, and obstetric cases. In at least one case of slight but obstinate menorrhagia much gynaecological treatment was unavailing, but complete relief ensued on expulsion of hookworms, which had been insufficient to cause a clinically noticeable anaemia.—I am, etc.,

Fiji, July 2nd. P. HARPER, M.D.

COLLES'S FRACTURE

SIR,—With reference to the paper on Colles's fractures by Mr. Harry Platt, in the *Journal* of August 13th, we beg to make the following observations.

1. *The Reduction of Colles's Fractures under Local Anaesthesia*:—In an article published by us in the *Lancet* of July 25th we drew attention to the advantages of local anaesthesia, and also mentioned the fact that its advantages are not made use of in the large teaching hospitals. It is especially useful to practitioners who can reduce fractures single-handed. We agree with Mr. Platt that it is wiser and easier to use this method in cases where the fracture is seen within a day or so after the injury.

2. *Reduction under Nitrous Oxide*.—On this point we disagree with Mr. Platt, as we are of the opinion that Colles's fractures should never be reduced under NO_2, because in the majority of cases it is impossible to obtain the necessary muscular relaxation so essential for correct reduction of the fracture.

3. *Fixation and Splinting*.—The author states that he prefers to use a plaster splint with the hand in slight flexion and adduction, as in this position the displacement is less likely to recur either immediately or about the third week, when it may be detected by the diligent masseuse. This tendency in some of these fractures to displace

themselves, in spite of proper supervision, we believe to be explainable in two ways: (*a*) in some of these fractures the line of cleavage is not transverse but oblique from before backwards, whereas in others the line is more transverse; (*b*) in the oblique fractures there is less serration of the bone edges, thus impaction is not so secure after reduction.

As we have performed most of our reductions under the fluorescent screen it is easy to decide if there is this tendency to displacement. As the result of numerous observations and reductions under the *x*-ray screen we have decided that there is no one definite way to put up a Colles fracture, as each one depends on its own individuality. We do, however, point out from our direct screening reductions that in the majority of cases we have to splint the wrist in flexion with slight ulnar deviation in order to keep perfect alignment of the fragments.

4. *Splintage.*—We agree with the author that the plaster splint moulded as he suggests is the method of choice, although we often use a light aluminium flexion splint.

5. *Post-Reduction Treatment.*—Here we disagree with Mr. Platt, and are of the opinion that massage and movements should be commenced as soon as possible.

—We are, etc.,

E. L. BARTLEMAN, M.B., Ch.B.Ed.
G. O. TIPPETT, M.B.Lond., F.R.C.S.

London, W.1, Aug. 22nd.

INJECTIONS OF OXYGEN

SIR,—Dr. Campbell's letter regarding oxygen may be very valuable as a statement of its tension in the tissues, but after working for ten years on the subject one ought to expect that he has come to some decision regarding its therapeutic value. He refers to some success obtained by "American" observers who have introduced oxygen into the system, but studiously avoids all reference to any work of a therapeutic nature done in this country, although his attention has been drawn to it; and when he says that oxygen "also benefits mucous membrane lacking oxygen owing to pathological changes" he uses a phraseology closely resembling that used by the person who took the liberty of drawing his attention to it. In the *Medical Press and Circular* for February 17th, 1932, in a short article on the value of oxygen, I speak of its value in gastritis, gastric ulcer, debility, and anaemia. I also speak of its value as a therapeutical agent in my book *The Heart and Spleen in Health and Disease*. At the meeting of the South Wales Branch of the British Medical Association on April 7th I read a paper on the value of oxygenating milk, a synopsis of which was forwarded to the Editor of the *Journal*. It may interest readers to know that as the result of introducing oxygen into the alimentary canal an increase takes place in the amount of haemoglobin and in the number of erythrocytes.—I am, etc.,

Swansea, Aug. 28th. G. ARBOUR STEPHENS.

SIR CHARLES HASTINGS

SIR,—May I be allowed to supplement the evidence as to the birthplace of Sir Charles Hastings, given in Mr. Hastings's letter in the *Journal* of August 20th (p. 383). My aunt, Miss Hastings, who is living now at Malvern in her 88th year, and who is Sir Charles's only surviving niece, has in possession the family bible, which contains an entry showing that he was born at Ludlow on January 11th, 1794, and was the ninth of a family of fifteen.

Miss Hastings tells an amusing story of how Sir Charles once immersed her in a bucket of water when as an infant she showed signs of delicacy. Her mother was far from satisfied as to the wisdom of this method of treatment, but a long and active life seems to have proved its efficacy.—I am, etc.,

Athenaeum, Aug. 24th. E. A. H. JAY.

SACRO-ILIAC SUBLUXATION

The reviewer wishes to assure Dr. James Fleming of his agreement with the views expressed under the above heading in the *Journal* of August 27th (p. 422). He pleads guilty to indulgence in irony when he wrote of the relief which British surgeons might feel, and irony in criticism is apt to be misunderstood. It was his intention in both the notices in question to support the position taken up by Sir Robert Jones and the late Dr. R. W. Lovett, holding, as he does, that the group of symptoms attributed by some to sacro-iliac subluxation have other causes, and that the existence of that displacement needs further proof. In an attempt to avoid dogmatism it seems that he fell into obscurity.

Obituary

SPENCER HONEYMAN

We greatly regret to announce the death of Mr. Spencer Honeyman at the age of 71. Mr. Honeyman served for forty-one years as Librarian of the British Medical Association, retiring in 1929. At the time of his retirement it was recalled that in 1888 Mr. Ernest Hart asked Mr. Honeyman to assist him in forming a library, and he was appointed Librarian on July 19th, 1893. An interesting point noted at the time was that Mr. Honeyman's retirement closed a connexion between his family and the Association which had existed since 1853, when his grandfather, Mr. T. J. Honeyman, became publisher of the *Journal* and collected the subscriptions of members. His father, Mr. J. N. Honeyman, was in the service of the Association from 1853 till his death in 1903. Mr. Spencer Honeyman had a remarkable record of service, inasmuch as in the whole of his forty-one years he never missed a working day on account of sickness or any other cause. The members of the staff with whom he worked and the numerous members of the Association with whom he came in contact in the Library will, we are sure, wish to express their sympathy with Mrs. Honeyman and the family in the death of one who was, in his unostentatious way, a devoted and faithful servant of the Association.

Universities and Colleges

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At the monthly meeting of the Royal Faculty of Physicians and Surgeons of Glasgow, held on September 5th, the following were admitted Fellows of the Faculty: T. S. Macaulay, G. D. Malhoutra.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—E. F. Baines, V. Constad, G. E. Ellison, J. O. Gordon, K. M. Hahn, M. S. Mules, T. D. Norton, C. V. P. Pillai, W. S. Pitt Payne, S. Pugmire, S. H. Tan, E. Teplitzky, J. C. Williams.

MEDICINE.—E. F. Baines, G. S. Grist, M. N. Mandelstam, F. C. Moll, W. S. Pitt Payne, A. E. A. Ridgway, C. A. Saggoo, S. H. Tan.

FORENSIC MEDICINE.—E. F. Baines, J. L. Bates, J. Harris, G. F. C. Harvey, R. P. Huggins, G. McArd, J. W. Meyers, W. Nicholls, A. E. A. Ridgway, B. Shapiro, S. H. Tan.

MIDWIFERY.—E. F. Baines, J. Harris, H. A. Kamel, M. F. Levick, T. E. Mitchell, J. E. Morrish, C. V. P. Pillai, S. Pugmire, A. E. A. Ridgway.

The diploma of the Society has been granted to Messrs. E. F. Baines, F. C. Moll, M. S. Mules, T. D. Norton, C. V. P. Pillai, W. S. Pitt Payne, and B. Shapiro.

Medical News

Mr. Wilfred Trotter has been appointed by the Home Secretary to be a member of the Advisory Committee on the Administration of the Cruelty to Animals Act, 1876, in succession to Sir Arthur Keith, who has resigned.

The Lord Chancellor has been pleased to confer the dignity of justice of the peace for the City of Oxford upon Alderman William Stobie, O.B.E., M.D.Ed., M.R.C.P., and Councillor Mrs. I. D. Harrison-Hall, M.B., Ch.B.

The annual dinner of past and present students of St. Mary's Hospital will be held on Friday, September 30th, at 7.30 p.m., at the Trocadero Restaurant. Sir Joseph Skevington, K.C.V.O., will be in the chair.

The Fellowship of Medicine and Post-Graduate Medical Association has arranged afternoon courses from September 12th to 24th at the Infants Hospital in diseases of infants and at the Royal Eye Hospital in ophthalmology. Other courses during September and October include medicine, surgery, and the specialties at the Westminster Hospital (September 19th to October 1st), Metropolitan Hospital (October 3rd to 15th), and the Miller Hospital (October 17th to 29th); dermatology at St. John's Hospital (October 3rd to 29th); oto-rhino-laryngology at the Central London Throat, Nose and Ear Hospital (October 3rd to 29th); proctology at the Gordon Hospital (October 3rd to 8th); diseases of the chest at the Brompton Hospital (week-end, October 8th and 9th). A series of lectures on renal disease will be given on Tuesday afternoons at the Medical Society of London at 4 o'clock. A week-end course on rheumatism will be given at Bath on October 1st and 2nd. A course of evening lecture-demonstrations on physical medicine will be given at the London Light Clinic, October 3rd to 27th, on Mondays and Wednesdays, and an evening course of demonstrations on rheumatism will be held by the British Red Cross Clinic on Tuesdays and Thursdays, November 8th to 24th. A week-end course in obstetrics will be given at the City of London Maternity Hospital on October 29th and 30th. All courses and lectures are open only to members of the Fellowship of Medicine (address, 1, Wimpole Street, W.1).

The ninth post-graduate course at Nauheim will be held on cardiac neurosis and treatment of heart disease in general from September 16th to 18th. The course is free.

The winter session at King's College Hospital Medical School will commence on October 1st, but, owing to the building operations on the new medical school, it will not be possible this year to hold the usual opening ceremony and inaugural address. In the place of the latter, however, an intensive post-graduate course will be held from 2 to 6 p.m., to which members of the medical school and other practitioners are invited. The annual dinner of past and present students will be held the same evening at 7.30 o'clock at the Connaught Rooms, Dr. Godfrey de Bec Turtle presiding. A series of post-graduate lectures, free to all medical practitioners, will be delivered in the lecture theatre of the medical school on Thursdays at 9 p.m. from October 13th to December 8th inclusive, and from January 12th to March 23rd, 1933. The opening lecture will be given by Dr. Wilfrid Sheldon on nervous habits in children. Subsequent lectures will be announced weekly in our medical diary.

The People's League of Health has been represented at the eighth conference of the International Union against Tuberculosis at The Hague and Amsterdam, on September 6th to 9th, by Dr. Nathan Raw and Miss Olga Nethersole.

The Minister of Health, at the beginning of the Parliamentary recess, arranged to devote three weeks to visits to certain distressed areas in order that he may inform himself by direct personal contact of their situation, of the measures being taken by the local authorities, and of the prospects for the coming winter. Sir Hilton Young's particular object is to examine the special difficulties affecting areas in which unemployment has been severe and prolonged, and for this purpose he has selected Lancashire, Tyneside, and South Wales as the areas to be visited.

At the International Medical Conference of the Anti-war Congress held at Amsterdam from August 27th to 29th, France, Germany, England, Holland, Switzerland, Czechoslovakia, the Far East, and other countries were represented by doctors, delegates, and nurses. General agreement was expressed concerning the terrible consequences of the past war on the lives and health of the working population—especially in the case of women and children. Dr. Bushnell (London) gave statistics regarding the increase of mental diseases and deficiency, undernourishment, and poor physique. Dr. Riese (Austria) described the practical impossibility of protecting a population against gas attacks during war. An "appeal of the doctors against war" was drawn up, and an international medical committee set up with headquarters in Paris and Berlin. The committee proposes to meet in London in 1933.

Messrs. Oliver and Boyd will publish shortly a monograph on *Maternal Behaviour in the Rat*, by B. P. Wiesner and N. M. Sheard. *The Mechanism of Creative Evolution*, by Dr. C. C. Hurst, will be published early in October by the Cambridge University Press.

In the August number of the *Bulletin of Hygiene* a new section has been included on "Conventions, Laws, and Sanitary Regulations: National and International." It is thought that this section will help medical officers to keep themselves informed of important sanitary enactments at home and abroad.

In 1929 there were 15,821 deaths from cancer in Spain, of which 1,649 were in Barcelona and 1,208 in Madrid. The mortality was higher in the north than in the south of the country.

Dr. Jules Bordet, director of the Institut Pasteur of Brussels, was made doctor, *honoris causa*, of Caen University on the occasion of the celebration of the fifth centenary of its foundation by Henry VI of England.

August 16th was the centenary of the birth of the psychologist Professor Wilhelm Wundt, who died in 1920.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

The **TELEPHONE NUMBERS** of the British Medical Association and the *British Medical Journal* are *MUSEUM* 9861, 9862, 9863, and 9864 (internal exchange, four lines).

The **TELEGRAPHIC ADDRESSES** are:
EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*
FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*
MEDICAL SECRETARY, *Medisecra Westcent, London.*

The address of the Irish Office of the British Medical Association is 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin), and of the Scottish Office, 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS

Gastric Mucin

Professor J. Macewen (Glasgow) writes: Apropos your notes on gastric mucin, in the *Epitome* of August 6th (para. 129), can any of your readers inform me where I can obtain a supply of a reasonably pure preparation at a reasonable price? The only preparation I have been able to obtain is too expensive for experimental and general use.

Impetigo Refractory to Treatment

Dr. L. I. HARDY (Hull) writes: I should be grateful if any of your readers could suggest anything to help me in treating an obstinate case of impetigo in an old man of 85. He commenced with pediculosis of the head, which was followed by impetigo. This cleared up under ung. hyd. ammon. Some weeks later it recurred and spread to his body. He was treated under ideal conditions with starch and boric poultices, ung. hyd. ammon. locally, and radiostoleum and Easton's syrup internally. The pediculosis was cleared up some weeks ago. Any slight pressure on any part of his skin is now followed by a flaccid bulla, which soon bursts, scales over, and eventually disappears, leaving a pigmented area. He has flatly refused to have injections of any kind. I am at present trying coal tar and Lassar's paste. The condition is certainly improving, but it has lasted about three months so far.

Chronically Enlarged Tonsil

"R. T." writes: I would be grateful to any reader who could suggest any local application (other than surgical) which would either help to reduce a chronically enlarged tonsil or which would tend to prevent a periodical mild inflammatory reaction, with at times the discharge of caseous follicular casts.

Remedy for Snoring

Dr. R. J. MORRIS (Harrogate) writes in reply to Dr. G. H. Johnson's inquiry (August 20th, p. 388): The "albar" breathing appliance is the most efficacious remedy for snoring I have found. He will obtain full particulars and illustration from the Albar Sales Company, Claygate, Surrey.

Income Tax

Tax on Share of a Practice

"N. W. W." asks for some idea of the amount of tax that would be payable by a single man on a share in a partnership worth £1,200 per annum. Is interest payable on the capital money "free of income tax"?

*** Assuming no interest to be payable, the tax liability would be as follows:

Income liable to tax...		£1,200
Deduct earned income relief, one-fifth of £1,200	£240	
Personal allowance	£100	£340
		£860

Of which £175 is chargeable at 2s. 6d.—that is,	£21	17	6
and the balance, £685, is chargeable at 5s.—that is,	£171	5	0
	£193	2	6

So far as interest is concerned, the payer is liable to account to the Revenue for tax on the amount at 5s. in the £, but can recoup himself by deducting it from the lender when paying the interest. Earned income relief, however, is not allowed on that portion of the liable income which is passed on in the form of interest. Thus, if "N. W. W." pays £240 interest, the above figures will hold good, except that that relief will be one-fifth of (£1,200 - £240)—that is, £192 instead of £240; he will therefore pay an additional tax on £48 at 5s. = £12, making £205 2s. 6d. in all, but will be entitled to deduct £240 at 5s. = £60 of that amount from the lender, leaving him in the ultimate position of having suffered £205 2s. 6d. - £60 = £145 2s. 6d. tax.

Share of Household Expenses

"L. H." is claiming to deduct as professional expenses two-thirds of the household expenses and £104 on account of servants' wages and keep. The amount agreed for former years was one-third for household expenses and one-half for servants' wages and keep.

*** There is no generally recognized schedule of allowances, because this is a point on which any general rule would be apt to work unfairly, as so much depends on the individual circumstances of each case. A useful check on the reasonableness of a claim is to consider what is left—that is, in this case, one-third of the household expenses and servants' wages and keep less £104—as appropriate to personal use, having regard to the general amenity and standard of comfort enjoyed. If "L. H." is satisfied that the balance of the total expenditure after his allocation to professional purposes is not inadequate, we advise him to press his claim, though whether to take it to the point of appearing personally before the Commissioners on appeal is a question we should prefer not to answer on the facts known to us.

Earned Income Relief

"PERPLEXED" has acquired a share in a practice, and is paying interest on the unpaid portion of the purchase money. Assuming that his share of the partnership liability is £1,000, out of which he pays £50 in interest, to what earned income relief is he entitled?

*** "Perplexed" pays tax at standard rate on the £50, but is entitled to deduct the tax on payment of the interest; in other words, he is the channel by which the lender pays tax on his £50 interest, and does not ultimately bear that tax himself. The tax he suffers is on the £950, which is his own income, and it is only on that amount that he is entitled to earned income relief—that is, one-fifth of £950 = £190 at 5s. in the £.

LETTERS, NOTES, ETC.

Blood Condition of X-Ray and Radium Workers

We learn that the *X*-Ray and Radium Protection Committee, which, as reported in the *Journal* of June 25th (p. 1182), is endeavouring to collect further evidence on the question of blood changes occurring in workers in radiological departments, has not yet received many replies to the questionary which it issued to various hospitals earlier in the year. The questions asked were as follows: (1) How many *x*-ray and radium workers have you whose blood is periodically examined? (2) Have any alterations of the blood occurred among the workers in your *x*-ray and radium departments? (3) If alterations have been found, please state in how many cases. (4) Will you supply typical blood counts and the pathological reports upon such cases? (5) Can you give some details of the worker's occupation and duration of service in each case cited? (6) How have the affected workers been treated and with what results? (7) Have you formulated any reasons why some of your workers showed blood changes, and if so, what were they? Replies should be forwarded to the honorary secretaries of the committee, 32, Welbeck Street, W.1. The committee hopes to make a review of the matter early in October.

A Warning

Information has reached the British Medical Association that a man claiming to be Dr. John Alexander Thomson has recently called at the offices of the Royal Medical Benevolent Fund, stating that he has been suffering from tuberculosis. Dr. J. A. Thomson died in 1931. The man posing as the late Dr. Thomson has also gone under the names of J. A. Payne, Eric Cox, Harold Johnson, and William Gray; he was convicted in 1929 and again in 1930 in respect of offences against the Dangerous Drugs and Poisons (Amendment Act, and the Dangerous Drugs (Consolidation) Regulations. His usual practice is to visit general practitioners telling them that he is Dr. J. A. Thomson and that he is suffering from a tuberculous kidney, to relieve the pain of which he needs morphine. To help general practitioners to identify the man we give the following description: age, 36 years; height, 5 ft. 4½ in.; birthplace, Preston; complexion, fresh; hair, brown; eyes, grey; marks—scar left side of left eye, several indistinct tattoo marks, and scar on left forearm.

Medical Services in Malaya

We are asked to correct an error in our Educational Number of September 3rd (p. 493) headed "Medical Services in Malaya." No cost of living is now payable in addition to salaries. Reductions in travelling, transport, night and acting allowances have been made.

Correction

In an article in the *Epitome* (August 20th, 1932, para. 180) describing the treatment of Parkinsonism, the word "trypaflavine" was used in error for "trypan blue."

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 35, 36, 37, 39, 40, and 41 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 38 and 39.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 172.

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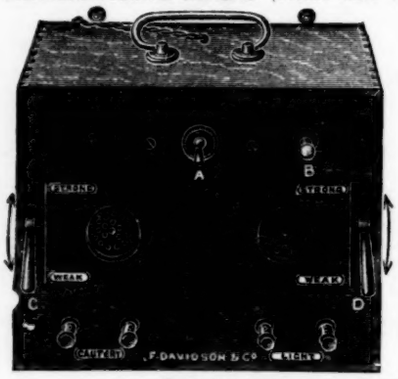

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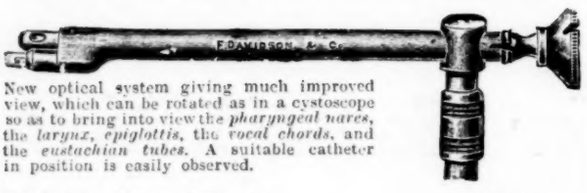

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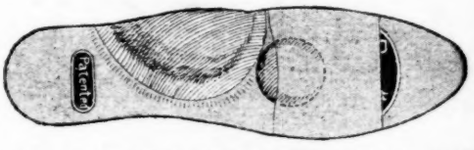

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